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Worcester

ANNUAL REPORTS

OF THE

COMMITTEE ON WATER,

THE

Water Commissioner, the Water Registrar
And the City Engineer,

OF THE

CITY OF WORCESTER

FOR THE

YEAR ENDING NOVEMBER 30, 1893.

THE NEW YORK
PUBLIC LIBRARY
ASTOR, LENOX AND
TILDEN FOUNDATIONS

Worcester, Mass.:
PRESS OF F. S. BLANCHARD & CO.,
154 FRONT STREET.
1894.

VIIA

ANNUAL REPORTS

OF THE

COMMITTEE ON WATER,

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1894.

WATER COMMITTEE, 1894.

Alderman F. W. GROUT, Chairman,
Alderman H. R. KING,
Alderman W. C. JEWETT,
President of Common Council T. P. BROWN,
Councilman G. M. RICE, 2d.,
Councilman W. H. BURNS,
Councilman F. J. HOUSTON.

WATER COMMISSIONER.

JOHN G. BRADY.

WATER REGISTRAR.

GEO. E. BATCHELDER.

ANNUAL REPORT OF THE COMMITTEE ON WATER.

DECEMBER 20, 1893.

To the City Council of Worcester:

In accordance with the provisions of the City Ordinances, your committee would herein respectfully submit their annual report for the year ending Nov. 30, 1893; together with the annual reports of the City Engineer, the Water Commissioner, and the Water Registrar to the committee.

The details of the different branches of the water department are fully and carefully analyzed in the reports of these three officers, and your committee will touch upon them only in a general way.

Last winter opened with the work at the Holden reservoir in an unfinished condition, and with the opening of spring the finishing touches were made, and with the clearing of the basin of vegetable growth, during the season of low water in the summer, the city has now an almost inexhaustible supply of the purest water from two independent water-sheds.

It has been the policy of former committees to take a liberal view of the extension of the water service, and believing that at least a part of the rapid growth of our city is due to a wise extension of that service, your committee has granted petitions for five and nine-tenths miles of new mains.

No pipe for street main service has been laid less than six inch, and in most cases it has been eight and twelve, thus indorsing the commissioner's plans for a "greater Worcester."

On the petition of the board of engineers of the fire department, large high service mains, with ample hydrants, have been laid in the streets in the rear of the business blocks from Exchange street to Bigelow court, and a system of branch mains with hydrants to protect the rear of the business section from Chatham to Elm streets.

The pressure on the high service at the City Hall during the day shows marked and rapid fluctuations from ninety pounds to one hundred and sixty pounds, showing that the demand is greater than the capacity of the pipe to deliver and maintain at a reasonably uniform pressure.

Your committee, therefore, heartily approve of the recommendation of the commissioner to lay another main from Lynde brook dam to the city, making a loop of the high service. Its advantages may be summed up as follows:

First. It will supply the fast increasing demands for high service for a long time to come.

Second. It will maintain a uniform pressure at all times and prevent a large part of the water hammer, now quite troublesome in places.

Third. It will nearly double the effective fire service in case of a large number of streams at a large fire.

Fourth. It will prevent the shutting off of water from a large portion of the city in case of repairs or connections to the single main now in service.

As reported by Mr. Brady, nearly six miles of old cement lined pipe have been replaced this year, and this policy should be faithfully carried out until the last of it is replaced.

The need of a more systematic and careful method of testing and regulating the meters is very well presented in the report of your registrar, and with the prospect of an entire revision of the ordinances in the near future, your careful consideration is respectfully requested. Your careful attention is also urged to the other recommendations of the registrar, commissioner and engineer. These officers have given these matters much thought and study, and a wise consideration of their suggestions would be of advantage to the city and to this department.

In closing, we wish to bear testimony to the honest, conscientious and pains-taking work of the officers whose reports we have quoted and which we now submit.

We believe the work of the water department to be faithfully, carefully and economically executed.

Respectfully submitted.

HENRY A. MARSH,
W. C. JEWETT,
C. H. PINKHAM,
I. E. COMINS,
GEO. M. RICE, 2nd,
WILLIAM H. BURNS,
JOHN P. FAY.

REPORT OF THE WATER COMMISSIONER.

To the Joint Standing Committee on Water:—

GENTLEMEN :—I herewith present my eighth annual report as Water Commissioner, for the year ending November 30th, 1893.

RESERVOIRS.

The water supply from the Lynde brook reservoir has been of good quality throughout the year. The drafts from this source of supply, owing to increasing consumption, and the long period of draught during the summer months, reduced the level from the overflow line, May 24th, to a point fifteen feet below, at the date of this report.

This low stage of the water uncovered a large area of the flowage surface, which was used to advantage in removing vegetable matter and stumps from the uncovered bottom, making a decided improvement in the condition of the reservoir.

HOLDEN STORAGE RESERVOIR.

The dam to provide larger storage capacity at this reservoir was completed last year, except the grading on loam and seeding the top and back slope to the dam, which, owing to the lateness of the season, was not done until early the present year.

A force of men and teams has been employed during the season clearing the grounds around the reservoirs, and the uncovered surface up to the highest flowage line, of brush, stumps and objectionable material, and covering the muck and swampy places with gravel to a depth sufficient to prevent pollution from this source, adding much to the good appearance of the reservoir and grounds adjoining the same. This work is nearly completed, and with all the farm buildings owned by the city, removed from the grounds near the reservoir early the coming season, this water supply will equal in purity that of Lynde brook.

The distributing reservoirs, connected with the water works, are in good condition.

The rainfall for the year at the Lynde brook and Holden reservoirs will be found in the following tables.

TABLE

Showing the daily height of water in LYNDE BROOK RESERVOIR and the rainfall for the year ending November 30, 1893.

Date.	DECEMBER		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY		AUGUST.		SEPTEMBER		OCTOBER		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	29.05	......	27.60	1.65	26.70	.22	29.85	.43	36.35	......	37.55	.40	37.15	......	35.65	......	32.80	......	30.10	.10	27.10	......	24 50	......
2	28 98	......	28.70	......	26.60	......	29.80	......	36 55	......	37.60	......	37.12	......	35.60	......	32.72	......	30.00	......	26.98	......	24.40	......
3	28.90	......	29.15	......	26.55	.20	29.75	......	36.75	......	37.70	......	37.08	......	35.50	......	32 60	......	29.90	......	26.80	......	24.30	......
4	28.90	......	29.10	......	26.45	......	29 70	.08	36 80	.02	38 45	3.20	36.98	......	35 40	......	32 50	......	29.80	......	26.65	......	24 15	.63
5	28.85	......	29.02	......	26.40	......	29.65	......	37.03	......	38 25	......	36.95	......	35.30	.46	32.45	.16	29.70	......	26.55	......	24 20	......
6	28.77	.14	28.95	.10	26 30	.77	29.60	......	37 10	.20	37.90	......	36 92	1.08	35.30	......	32 40	.15	29.60	......	26 45	......	24 15	......
7	28.75	......	28.85	......	26 90	......	29.55	......	37.30	.71	37 80	......	36.98	......	35.20	......	32.35	.15	29.50	.93	26 35	.20	24.05	......
8	28.70	.52	28.80	......	27.45	......	29.50	......	37 50	.39	37 65	......	36.92	......	35 10	.10	32 30	......	29 50	......	26.25	......	23.95	......
9	28.85	......	28.60	.37	27.50	......	29 45	1.05	37.90	......	37.60	......	36.85	......	35.05	......	32.20	......	29.35	......	26.10	......	23.90	......
10	28.90	......	28.70	......	28.10	1.08	29 80	......	37 85	......	37.55	......	36.85	......	34.98	......	32 10	......	29.30	......	25.95	......	23 75	......
11	28.95	......	28.60	......	29.65	......	30.10	......	37.75	......	37 50	......	36 80	......	34.85	......	32.02	......	29.15	......	25.80	......	23.65	......
12	28.95	......	28 50	......	29.85	......	30.50	1.12	37.70	......	37.45	......	36.72	......	34.75	.07	32 00	.52	29.10	......	25 65	......	23.50	......
13	28.95	......	28.35	......	29.85	.90	31.35	......	37.65	.01	37.45	.43	36.66	.06	34.65	......	31.90	......	28 90	......	25 55	......	23.40	.02
14	28.98	.20	28.20	......	29.90	......	32.05	......	37 62	......	37.58	......	36.65	.30	34.58	......	31.75	......	28.85	......	25 45	.80	23.30	......
15	28.85	......	28.15	.08	29 90	......	33.15	1 20	37.70	54	37.55	......	36.62	......	34.47	......	31.55	......	28.80	......	25.35	......	23 15	.03
16	28.85	......	28.10	......	30 10	......	34.05	......	37.72	......	37.50	2.00	36.50	......	34 37	......	31.41	......	28.75	.72	25.20	......	23.05	......
17	28 80	......	27.98	......	30.10	......	34.25	......	37.67	......	38.14	......	36.40	.30	34 25	.07	31 30	.05	28.65	......	25 00	......	22.95	......
18	28 80	......	27.85	......	30.15	.50	34 35	......	37 60	......	37 95	.02	36 40	......	34 15	......	31.20	......	28.55	......	24.95	......	22 80	.05
19	28 75	......	27.75	......	30.20	.10	34.40	......	37.52	......	37 80	......	36.30	......	34.05	......	31.10	......	28.42	.15	24 80	......	22 70	......
20	28.65	.05	27.70	......	30 15	......	34.40	......	37.50	1.26	37 65	......	36.20	......	33 95	......	31 00	......	28.35	......	24 60	......	22 60	......
21	28.55	......	27.55	......	30 15	......	34 45	.08	37 72	......	37.57	......	36 15	......	33.85	......	30.95	.84	28 25	......	24 45	......	22.45	......
22	28.50	......	27.45	......	30.10	.50	34.60	......	37.80	......	37.50	.06	36.05	.79	33.75	.12	30 90	......	28.05	......	24 30	......	22.40	.68
23	28.45	......	27.33	......	30 05	......	34 60	.14	37.70	......	37 45	......	36.10	......	33 65	.08	30.80	......	27.95	02	24 20	2.75	22 40	......
24	28.35	......	27.25	......	30.05	.16	34.65	......	37.65	......	37 45	......	36.02	......	33.57	......	30.75	.91	27 90	......	24 65	......	22.40	......
25	28.25	.02	27.15	.15	30.03	.24	35.03	.13	37 55	.22	37.35	......	35.95	......	33.40	.13	30.70	......	27.75	.10	24.80	......	22.20	......
26	28.15	......	27.07	......	30 05	......	35.35	......	37.55	......	37.30	......	35.96	.15	33 35	.15	30 60	......	27.65	......	24.70	......	22.10	......
27	28.10	......	26.98	......	29.95	......	35.70	......	37.50	.29	37.20	.41	35 93	......	33.25	......	30.50	......	27.50	......	24 60	......	21.95	......
28	27.97	......	26 95	......	29.85	......	35.85	......	37.57	......	37.25	......	35 85	......	33.10	......	30 40	......	27 40	......	24.70	.90	21.90	.68
29	27.75	......	26.85	.30	......	......	35.90	......	37.53	......	37.30	......	35 80	......	33.02	.10	30 30	.75	27.30	.05	24 80	......	21 97	......
30	27 75	......	26.80	......	......	......	36.00	......	37 50	......	37 22	......	35.75	......	32.95	......	30 30	......	27.15	......	24.70	......	22 (2	......
31	27.65	......	26.75	.06	......	......	36.15	......	......	......	37.20	......	......	......	32 88	......	30 20	......	......	......	24.60	......	......	......
Totals,		.93		2.71		4.67		4.23		3.64		6.52		2.68		1.28		3 53		2 07		4.65		2.09

The rainfall is shown in inches and decimals of an inch.- The depth of water is shown in feet and decimals of a foot. Height of rollway, 37.40 feet.
Rainfall for the year ending November 30, 1893, 39 inches.

TABLE

Showing the daily height of water in HOLDEN RESERVOIR and the rainfall for the year ending November 30, 1893.

Date.	DECEMBER.		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	9.50	......	7.61	......	8.50	......	18 50	.44	30.40	......	30 25	.70	30.00	......	29.14	......	26.45	......	24.10	......	21.90	......	19.80	......
2	......	......	......	1 90	......	......	......	......	30 40	......	30.25	......	20.00	......	29.10	......	26.30	......	24 00	......	21.80	......	19.76	......
3	......	......	......	......	......	......	......	.26	30 40	......	30.25	......	30.00	......	29.00	......	26 20	......	23.90	......	21.70	......	19 70	......
4	......	......	......	......	......	......	......	......	30.40	......	31.40	3.12	30.00	......	28.90	......	26.10	......	23.80	......	21.60	......	19.50	......
5	......	......	......	......	......	......	......	......	30.35	.06	31.40	......	30 10	......	28.80	......	25 95	......	23.70	......	21.45	......	19.30	.62
6	......	......	......	......	......	......	......	......	30.35	......	30.60	......	30.20	.76	28.75	.43	25.85	.14	23.55	......	21 30	......	19.10	......
7	......	......	......	.15	......	1.25	......	......	30 35	......	30 40	......	30.13	......	28.66	......	25.75	......	23 50	......	21 16	25	18.98	......
8	......	.15	......	......	......	......	......	......	30.60	1.25	30.35	......	30 10	......	28.55	......	25.65	.16	23 50	.92	21.00	......	18 93	......
9	......	......	......	......	......	......	......	......	30.60	......	30.30	......	30.08	......	28 50	......	25.68	......	23 48	......	20 90	......	18 90	......
10	......	......	......	.31	......	1.35	......	.74	30.35	......	30.25	......	30.05	......	28.50	......	25 48	......	23.40	......	20.85	......	18.85	......
11	......	......	......	......	......	......	......	......	30.35	......	30 25	......	30.00	......	28.40	......	25.40	......	23 30	......	20.80	......	18 80	......
12	......	......	......	......	......	......	......	.78	30.30	......	30.25	......	29.00	......	28.35	......	25 45	.52	23.20	......	20.70	......	18 70	......
13	......	......	......	......	......	......	......	......	30.25	......	30.25	......	29.80	......	28.25	......	25.35	......	23.10	......	20.60	......	18 65	.02
14	......	......	......	......	......	.86	......	......	30.30	......	30.28	.51	29.70	.30	28.10	......	25.25	......	23 00	......	20. 0	92	18.60	......
15	......	......	......	......	......	......	......	1 30	30.33	......	30.24	......	29.16	......	28.00	......	25.10	......	22 90	......	20.50	......	18 60	.10
16	......	.08	......	......	......	......	......	......	30.30	.56	30.21	......	29.50	......	27.95	......	25.00	......	22.80	......	20 45	......	18.55	......
17	......	......	......	......	......	......	......	......	30.30	......	30.55	1.84	29.50	......	27.85	......	24.90	......	22.90	.81	20.35	......	18.45	......
18	......	......	......	......	......	......	......	......	30.25	......	30.50	......	29.50	.30	27.75	......	24.80	......	22.80	......	20.30	......	18.40	......
19	......	......	......	......	......	.50	......	......	30.20	......	30.48	......	29 60	......	27 60	......	24.70	......	22.70	.16	20 20	......	18.30	......
20	......	......	......	......	......	......	......	......	30 35	......	30.34	......	29.50	......	27.50	......	24.60	......	22 70	......	20.15	......	18.22	......
21	......	......	......	......	......	......	......	......	30.20	1 16	30.24	......	29.40	......	27.40	......	24.80	......	22.60	......	20.05	......	18 20	......
22	......	......	......	......	......	......	......	.05	30 35	......	30.22	......	29.40	......	27.38	......	24.70	.03	22.50	......	20 00	......	18.15	.70
23	......	......	......	......	......	.50	......	......	30.25	......	30.20	......	29.45	......	27.33	.36	24.60	......	22.40	......	19.95	......	18 10	......
24	......	......	......	......	......	.27	......	.26	30.25	......	30 25	.08	29.55	.76	27 20	......	24.70	......	22.30	......	20.30	2.70	18.05	......
25	......	......	......	.08	......	......	......	......	30.20	.10	30.22	......	29.45	......	27.10	......	24.50	.87	22 20	......	20 50	......	18.00	......
26	......	.20	......	......	......	.30	......	......	30.25	......	30 20	......	29.30	......	26 95	.12	24.40	......	22 15	.16	20 50	......	17 95	......
27	......	......	......	......	......	......	......	......	30.25	.27	30 20	.10	29.20	.10	26.80	.15	24.30	......	22 10	......	20 40	......	17.90	......
28	......	......	......	......	18.50	......	30.10	......	30.20	......	30.18	......	29.20	......	26.75	......	24.20	1.05	22.05	......	20.45	.98	17.85	......
29	......	......	......	......	......	......	......	......	30.20	......	30.17	......	29.15	......	26.65	......	24 30	......	22.05	.05	20.25	......	17.85	.65
30	......	......	......	.05	......	......	......	......	30.20	......	30.17	......	29.15	......	26.55	.15	24 30	......	22.00	......	20 10	......	17.85	......
31	7.61	......	8.50	......	......	......	30.41	......	......	......	30.16	......	......	......	26.45	......	24.18	......	......	......	20.00	......	......	......
Totals,		.43		2.49		5.03		3.83		3.40		6.35		2.22		1.21		2.77		2.10		4 85		2.09

The rainfall is shown in inches and decimals of an inch. The depth of water is shown in feet and decimals of a foot. Height of rollway, 30.10 feet.

Rainfall for the year ending November 30, 1893, 36.77 inches.

Length and Size of New Pipe Laid During the Year Ending November 30, 1893.

STREET.	LOCATION.	PIPE.		HYDRANTS.	GATES.	
		Size in Inches.	Length in Feet.			
Ætna,	From Mendon to Cutler street,	8	354		1	High service.
Almont avenue,	" Plantation to Hamilton street,	6	540	3	2	High service
Armory,	" Southgate street, south,	8	634	4	1	
Bancroft,	" Chandler to Bluff street,	6	595	1	3	
Bloomingdale road,	" End of pipe to Suffolk street,	8	319	1		
" "	" " " " "	8	1,144		2	High service.
Cambridge,	Used for street connections,	6	43			
"	" " "	8	45			
"	From Chelsea street, west,	12	1,875	3	6	
Canterbury,	" Hammond street, west,	8	367	1	1	
Carlton,	" Front to Mechanic street,	12	370	1	2	High service.
Central avenue,	" End of pipe, north,	6	612	2		
Chatham,	" Main to High street,	6	341	1	2	High service.
Clarendon,	" Plantation street to Dell avenue,	8	942	3	2	High service.
Dartmouth,	" Plantation street to Almont avenue,	8	275		1	High service.
Dean,				1		
Dixon avenue	" Lincoln street, east,	6	441	1	1	High service.
Downing,	" Main to Woodland street,	6	440	1	1	
Ekman,	" End of pipe to Carlstad street,	6	918	3	1	High service.
Exchange,	" Main to Waldo street,	12	315	1	3	High service.
Fales,	" West Boylston street, east,	8	223		1	
Germain,	" Highland to Mount Hope street,	8	1,200	2	1	
Gilman,	" End of pipe, west,	6	501	1	1	High service.
Grafton,	Street connections,	8	64			High service.
Grand View ave.,	From Leicester to Stafford streets,	8	1,940	4	2	
Greendale avenue,	" West Boylston street, east,	8	404	1	1	
Greenwood,	" Tatman street, south,	8	2,110	5	1	High service.
Hale,	" Grafton street, east,	8	437	2	2	High service.
Harlow,	" Crescent street, east,	8	350	1	1	
Harrison,	Street connections,	6	24			

LENGTH AND SIZE OF NEW PIPE LAID DURING THE YEAR ENDING NOVEMBER 30, 1893.

STREET.	LOCATION.	PIPE.		HYDRANTS.	GATES.	
		Size in Inches.	Length in Feet.			
Harrison,	From Green to Water street,	12	608	2	3	High service.
Heardsleigh	" Sumner to Fountain street,	6	482	1	2	
Highland,	Street connections,	8	32			
"	From Agricultural street, west,	16	1,633	5	7	
Huntington ave.,	" West Boylston street, west,	12	360	1	2	
Institute road,				1		
Lancaster,				1		
Lyford,	" Paine street, west,	6	354	1	1	High service.
Lyman,	" Webster street, west,	6	1,512	3	1	
May,	Street connections,	6	34			
"	From June street, east,	12	1,934	3	5	
Mechanic,	" Carlton to Norwich street,	12	372	2	2	High service.
Norwich,	" Mechanic to Foster street,	12	307	1	2	High service.
Paine,	" Vinton to Norton street,	8	870	1	2	High service.
Plum,	" Shrewsbury street, east,	6	580	2	2	
Shattuck,	" From end of pipe, east,	6	300			High service.
Stafford,	" Grand View avenue, south,	8	300			
"	Street connections,	12	12			
Steele,	From Whipple street, south,	8	850	2		High service.
Tatman,	" Greenwood street, west,	8	769	2	1	High service.
Trumbull,	" Front to Green street,	12	527	2	4	High service.
Vinton,	" Lincoln street, west,	8	552	3	2	High service.
Wachusett,				1		
Waldo,	" Foster to Exchange street,	12	546	1	3	High service.
Webster,	" End of pipe to Lyman street,	8	305	1		
West Boylston,	" End of pipe to Fales street,	12	321	1	1	
West,	" End of pipe, south,	6	165			High service.
Wor. woolen mills,				4		
			31,548	84	79	

LENGTH AND SIZE OF PIPE RELAID DURING THE YEAR ENDING NOVEMBER 30, 1893.

STREET.	LOCATION.	PIPE.		HYDRANTS.	GATES.	
		Size in Inches.	Length in Feet.			
Baker,	From Lake to Montague street,	8	1,050	2	3	
Barton place,	" Main street, west,	8	241	1	2	High service.
Beacon,	" Hermon to Lagrange street,	12	892	2	6	
Burt,	" Grafton to Temple street,	6	530	1	2	
Charlton,	" Main to Beacon street,	6	507	2	1	
Church place,	" Pleasant street, south,	6	171	1	1	
Claremont,	" Silver to Woodland street,	8	472		1	
"	Street connections,	6	9			
Concord,	From Grove to Prescott street,	6	268	1	1	
Cutler,	" Grafton street, south,	8	1,192	3		High service.
Cypress,	" Exchange to North Foster street,	8	405	2	2	
Dewey,	" Austin to Pleasant street,	8	589	2	1	
Dix,	" Harvard to North Ashland street,	6	1,160	2	1	
Exchange,	" Main to Union street,	12	800	2	3	
Foster,	" Waldo to North Foster street,	8	150	1	1	
Green,	" Washington street to B. & A. R. R.,	12	367	2	2	
Grafton,	" Water to Barclay street,	12	1,456	3	5	
Hamilton,	Street connections,	6	28			
"	From Orient to Plantation street,	16	723	1	4	High service.
Hancock,	" Main to Hathaway street,	6	283	1		
Hawthorn,	" Main to Woodland street,	6	473	2	1	
Hollywood,	" May to Oberlin street,	6	704	1	2	
John,	" Harvard to North Ashland street,	6	1,083	3	1	
King,	" Queen to Woodland street,	6	349			
"	" Main to Queen, Chandler to Woodland,	8	1,704	2	2	
"	Street connections,	12	12			
Kingsbury,	From Queen to Shepard street,	8	307	1	3	
"	" Queen to Woodland street,	12	275			

Length and Size of Pipe Relaid During the Year Ending November 30, 1893.

STREET.	LOCATION.	PIPE. Size in Inches.	PIPE. Length in Feet.	HYDRANTS.	GATES.
Lagrange,	From Main to Beacon street,	6	653		
Lake,	" Leicester to Mill street,	8	1,713	3	4
Lexington,	" Grove to Prescott street,	6	293	1	1
Linwood,	" Lincoln to Fountain street,	6	400	1	
Loudon,	" Main to Woodland street,	6	477	1.	1
Lovell court,	" South Irving street, east,	6	353	1	1
Lyon,	" Shrewsbury street, east,	6	505	1	
Main,	" Beaver to Richards street,	16	112		
Montague,	" End of pipe to Baker street,	6	226		
Norwood,	" Main to Woodland street,	6	499	1	1
Oread place,	" Main to Alden street,	6	338		
Prescott,	Across Mill brook,	12	36		
Queen,	From Austin to Chandler street,	6	260		
"	" Chandler to Kingsbury street,	12	1,730	4	9
Richards,	" Main street, east,	12	1,380	2	1
Southbridge,	" End of pipe to Hammond street,	12	370		
Suffolk,	" Bloomingdale to Wall street,	8	1,220	3	2
Sycamore,	" Main to Beacon street,	6	475	2	1
Union avenue,	" Ward street, east,	6	884		2
Valley,	" Castle street to Oread place,	6	244	1	1
Winthrop,	" Vernon street, east,	6	185		1
Woodland,	Street connections,	8	46		
"	From May to King street,	12	1,136		3
			29,735	59	73

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER, 30, 1893.

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Almont avenue,	Corner Plantation street, on west side,	Chapman,	6	2	6	6	New.
" "	270 feet north of Hamilton, on west side,	"	6	2	6	6	"
" "	Corner Dartmouth street, on west side,	"	6	2	6	6	"
Armory,	Corner Southgate street, on east side,	"	6	2	6	8	"
"	300 feet south of Southgate street, on east side,	"	6	2	6	8	"
"	450 feet south of Southgate street, on east side,	"	6	2	6	8	"
"	600 feet south of Southgate street, on east side,	"	6	2	6	8	"
Baker,	Corner Ball street, on north side,	"	6	2	6	8	"
"	Corner Montague street, on north side,	"	6	2	6	8	"
Bancroft,	Corner Bluff street, on west side,	"	6	2	6	6	"
Barton place,	In front of Patrol house, on north side,	"	6	4	6	8	" H. S.
Beacon,	300 feet south of Hermon street, on west side,	"	6	2	6	12	Holyoke.
"	200 feet south of Jackson street, on east side,	"	6	2	6	12	New.
Blackstone,	Corner Charles street,	"	4	2	4	6	Flush.
Bloomingdale road,	319 feet east of Suffolk street, on east side,	"	6	2	6	8	New.
Burt,	300 feet south of Grafton street, on north side,	"	6	2	4	6	"
Cambridge,	Opposite Woodward street, on north side,	"	6	2	6	12	"
"	75 feet west of Norwich R. R., on north side,	"	6	2	6	12	"
"	Opposite Taft street, on north side,	"	6	2	6	12	"
"	Corner Southbridge street,	"	4	2	6	12	Flush.
"	Opposite Chelsea street,	"	6	2	6	12	"
Canterbury,	340 feet south of Hammond street, on west side,	"	6	2	6	8	New.
Carlton,	On Front street, opposite Carlton street,	"	6	4	6	12	" H. S.
Central,	Corner Union street,	Boston,	4	2	4	6	Flush.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER, 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Central avenue,	Corner Orchard avenue, on west side,	Chapman,	6	2	6	6	New.
“ “	306 feet north of Orchard avenue,	“	6	2	6	6	“
Charlton,	200 feet east of Main street, on north side,	“	4	2	4	6	“
“	Corner Beacon street, on north side,	“	4	2	4	6	“
Chatham,	40 feet east of High street, on south side,	“	6	2	6	6	“ H. S.
Chelsea,	Corner Brussels street,	“	6	2	6	8	Flush.
Church place,	On end of pipe, 170 feet south of Pleasant street,	“	6	2	6	6	New.
Clarendon,	Corner Ingleside avenue, on north side,	“	6	2	6	8	“
“	Corner Fairmont avenue, on north side,	“	6	2	6	8	“
“	Corner Dell avenue, on north side,	“	6	2	6	8	“
Concord,	Corner Prescott street, on north side,	“	6	2	6	6	Flush.
Cutler,	Corner Ætna street, on west side,	“	6	2	6	8	Wood Post, H. S.
“	300 feet south of Grafton street, on west side,	“	6	2	6	8	New, H. S.
“	600 feet south of Grafton street, on west side,	“	6	2	6	8	Philadelphia, H. S.
Cypress,	200 feet south of Exchange street, on west side,	“	6	2	6	8	New.
“	Corner North Foster street, on west side,	“	6	2	6	8	Flush.
Dean,	Corner Salisbury street, on west side,	“	6	2	6	6	New.
Dewey,	300 feet south of Pleasant street,	“	6	2	6	8	“
“	Opposite Austin street,	“	6	2	6	8	Wood Post.
Dix,	Corner Goulding street, on north side,	“	6	2	6	6	Flush.
“	Corner Harvard street, on north side,	“	6	2	6	6	New.
Dixon avenue,	420 feet south of Lincoln street, on west side,	“	6	2	6	6	“
Downing,	350 feet north of Main street, on west side,	“	4	2	4	6	“
E. Worcester,	Corner Henry street,	Boston,	4	2	4	6	Flush.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
E. Worcester,	Corner Larkin street,	Boston,	4	2	4	6	Flush.
"	Corner Cross street,	Chapman,	4	2	4	6	"
Ekman,	Corner Carlstadt street, on north side,	"	6	2	6	6	New.
"	300 feet west of Greenwood street, on north side,	"	6	2	6	6	"
"	600 feet west of Greenwood street, on north side,	"	6	2	6	6	"
Exchange,	Corner Union street,	"	6	2	6	12	"
"	Opposite Cypress street,	"	6	2	6	12	Boston.
Foster,	Corner North Foster street,	"	6	2	6	8	New.
Germain,	Corner Mount Hope street, on west side,	"	6	2	6	8	"
"	600 feet north of Highland street, on west side,	"	6	2	6	8	"
Gilman,	300 feet west of Paine street,	"	6	2	6	6	"
Grafton,	100 feet east of Providence street, on north side,	"	6	2	6	12	"
"	300 feet east of Coral street,	"	6	2	6	12	"
"	Opposite Coral street,	"	6	2	6	12	Philadelphia.
Grand View avenue,	Corner Leicester street, on east side,	"	6	2	6	8	New.
" "	Corner Stafford street, on east side,	"	6	2	6	8	"
" "	650 feet south of Leicester street, on east side,	"	6	2	6	8	"
" "	650 feet north of Stafford street, on east side,	"	6	2	6	8	"
Green,	Corner Washington street,	"	6	2	6	12	Flush.
"	Opposite Franklin street,	"	6	4	6	12	Philadelphia.
Greendale avenue,	400 feet east of West Boylston street, on north side,	"	6	2	6	8	New.
Greenwood,	500 feet south of Tatman street, on east side,	"	6	2	6	8	"
"	1,050 feet south of Tatman street, on east side,	"	6	2	6	8	"
"	500 feet north of Upland street, on east side,	"	6	2	6	8	"

Location, Size and Kind of Hydrants, New and Changed, During the Year Ending November 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Greenwood,	1,050 feet north of Upland street, on east side,	Chapman,	6	2	6	8	New.
"	Opposite Upland street, on east side,	"	6	2	6	8	"
Hale,	215 feet east of Grafton street, on north side,	"	6	2	6	8	"
"	Corner Plantation street, on north side,	"	6	2	6	8	"
Hamilton,	Corner Dupont street, on north side,	"	6	2	6	16	" H. S.
Hancock,	300 feet south of Main street, on east side,	"	4	2	4	6	"
Harlow,	600 feet east of Crescent street,	"	6	2	6	8	"
Harrison,	Corner Carpenter street, on north side,	"	6	2	8	12	"
"	100 feet east of Green street, on north side,	"	6	2	8	12	"
Hawthorn,	200 feet north of Main street, on east side,	"	6	2	6	6	"
"	Corner Woodland street, on east side,	"	6	2	6	6	Wood Post.
Heardsleigh,	240 feet east of Summer street, on north side,	"	4	2	4	6	New.
Highland,	At Newton square, opposite June street,	"	6	2	6	16	"
"	517 feet east of Newton square,	"	6	2	6	16	"
"	Corner of Harvard street,	"	4	2	4	16	Flush.
"	50 feet west of Park avenue, on north side,	"	6	2	6	16	New.
"	Corner Germain street, on north side,	"	6	2	6	16	"
"	Corner Buffalo street, on north side,	"	6	2	6	16	"
Hollywood,	300 feet south of May street, on east side,	"	4	2	4	6	"
Huntington avenue,	340 feet west of West Boylston street, on north side,	"	6	2	6	12	"
Institute road,	Corner Dean street,	"	6	2	6	6	"
John,	Corner Wesby street, on north side,	"	6	2	6	6	Flush.
"	Corner Harvard street, on north side,	"	6	2	6	6	New.
"	In front of No. 16,	"	6	2	6	6	Flush,

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
King,	In front of No. 20,	Chapman,	6	2	6	8	Flush.
"	Opposite Shepard street,	"	6	2	6	8	New.
Kingsbury,	Corner Woodland street, on north side,	"	6	2	6	12	"
Lake,	Corner Leicester street, on east side,	"	6	2	8	8	"
"	Opposite Elmer street, on east side,	"	6	2	8	8	"
"	Opposite Sutton street, on east side,	"	6	2	8	8	"
Lancaster,	Corner Institute road,	"	6	2	6	6	"
Lexington,	Corner Prescott street, on north side,	"	6	2	6	6	Flush.
Lincoln avenue,	Corner Brittan street,	"	6	2	6	6	Chapman.
Linwood,	150 feet west of Fountain street, on south side,	"	4	2	4	6	Flush.
Loudon,	300 feet north of Main street, on east side,	"	4	2	4	6	New.
Lovell court,	At south end of court,	"	4	2	4	6	"
Lyford,	On end of pipe,	"	6	2	6	6	"
Lyman,	500 feet west of Webster street, on south side,	"	4	2	4	6	"
"	1,000 feet west of Webster street, on south side,	"	4	2	4	6	"
"	On end of pipe at soap works,	"	4	2	4	6	"
Lyon,	350 feet south of Shrewsbury street, on east side,	"	4	2	4	6	"
May,	At Norcross' driveway, on west side,	"	6	2	6	12	"
"	In front of Mr. Norcross' house, on west side,	"	6	2	6	12	"
"	600 feet west of Lovell street,	"	6	2	6	12	"
Mechanic,	Corner Norwich street, on north side,	"	6	4	6	12	" H. S.
"	Opposite Carlton street, on north side,	"	6	4	6	12	" H. S.
Norwich,	40 feet south of Foster street, on east side,	"	6	4	6	12	" H. S.
Norwood,	300 feet north of Main street, on west side,	"	4	2	4	6	"

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Outfall avenue,		Philadelphia,	4	2	4	6	Chapman.
Paine,	Corner Lyford street, on west side,	Chapman,	6	2	6	8	New.
Plum,	Corner East Worcester street,	"	4	2	4	6	"
"	50 feet south of Shrewsbury street,	"	4	2	4	6	"
Prospect,	Corner Mulberry street,	Philadelphia,	4	2	4	8	Flush.
Richards,	500 feet east of Main street, on south side,	Chapman,	6	2	6	12	New.
"	850 feet east of Main street, on south side,	"	6	2	6	12	"
Southbridge,	Corner Washburn street,	Boston,	4	2	4	12	Flush.
"	In front of No. 180,	"	4	2	4	12	"
Steele,	400 feet south of Whipple street,	Chapman,	4	2	4	8	New.
"	850 feet south of Whipple street,	"	4	2	4	8	"
Suffolk,	Corner Norfolk street, on east side,	"	6	2	6	8	Wood Post.
"	300 feet south of Norfolk street,	"	6	2	6	8	Philadelphia.
"	300 feet west of Wall street,	"	6	2	6	8	4″ Chapman.
Sycamore,	200 feet east of Main street on north side,	"	4	2	4	6	New.
"	Corner Beacon street,	"	4	2	4	6	Flush.
Tatman,	350 feet west of Greenwood street, on north side,	"	6	2	6	8	New.
"	750 feet west of Greenwood street, on north side,	"	6	2	6	8	"
Thomas,	Corner Union street,	Boston,	4	2	4	16	Flush.
"			6	2	6	16	"
"	In front of No. 17,	Chapman,	6	2	6	16	"
Trumbull,	Opposite Sessions' office on each side,	"	6	4	6	12	New, H. S.
"	In front of drug store, on each side,	"	6	4	6	12	"
Union,	Corner Central street,	"	4	2	4	12	Flush.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER, 30, 1893.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Valley,	Corner Oread place, on west side,	Chapman,	6	2	6	6	New.
"	Corner Castle street,	Boston,	4	2	4	6	Boston.
Vinton,	Corner Lincoln street, on north side,	Chapman,	6	2	6	8	New.
"	Corner Paine street, on north side,	"	6	2	6	8	"
"	200 feet west of Paine street,	"	6	2	6	8	"
Wachusett,	Between Institute road and Salisbury street,	"	6	2	6	6	"
Waldo,	Opposite Waldo House, on west side,	"	6	4	6	12	" H. S.
Webster,	Corner Lyman street, on west side,	"	6	2	6	8	"
West,	Near Salisbury street,	"	4	2	4	6	Boston.
West Boylston,	Corner Fales street, on east side,	"	6	2	6	12	New.
Wor. Woolen Mills,	In yard,	"	6	2			"
" " "	In yard,	"	6	2			"
" " "	In yard,	"	6	2			"
" " "	In yard,	"	6	2			"
Exchange,	Opposite Worcester Theatre,	"	6	4	6	12	" H. S.
Queen,	Corner driveway to City Hospital,	"	6	2	6	12	"
"	Corner driveway to Colton estate,	"	6	2	6	12	"
"	Opposite Davis street,	"	6	2	6	12	Wood Post.
"	Corner King street,	"	6	2	6	12	Flush.

TOTAL LENGTH AND SIZE OF PIPE LAID, AND NUMBER OF GATES AND HYDRANTS IN USE NOVEMBER 30, 1893.

	2″	3″	4″	5″	6″	8″	10″	12″	16″	18″	20″	24″	30″	Miles.	Gates	Hydrants
Prior to 1893,	11,740	930	108,414	1,487	244,177	135,754	7,734	64,981	60,402	1,980	21,088	11,414	7,060	128.255	1,313	1,150
Laid in 1893,					19,239	23,575		16,001	2,468					11.6	152	163
Total,	11,740	930	108,414	1,487	263,416	159,329	7,734	80,982	62,870	1,980	21,088	11,414	7,060	139.855	1,465	1,313
Pipe taken up, 1893,	1,520	832	15,415		8,832	1,592		470	112					5.434	42	43
Total feet,	10,220	98	92,999	1,487	254,584	157,737	7,734	80,512	62,758	1,980	21,088	11,414	7,060		1,423	1,270
Total miles,	1.936	.018	17.613	.281	48.217	29.817	1.464	15.247	11.886	.375	3.993	2.161	1.337	134.421		

CEMENT-LINED MAIN PIPE IN USE NOVEMBER 30, 1893.

	2″	3″	4″	6″	8″	10″	12″	16″	18″	20″	Total
1864			687				5,335	3,511	1,980	1,056	12,569
1865	144		2,851	1,183	1,523			776			6,477
1866	100				1,680			971			2,751
1867		647	27	599	207						1,480
1868	149		4,864								5,013
1869	1,616		1,339		265						3,220
1870	190		5,316	2,828	2,375						10,709
1871	115		1,795	2,070	2,476						6,456
1872			568	904			2,000				3,472
1873			814	6,205	4,407						11,426
1874			422	1,571	1,073						3,066
1875				287							287
1877					100						100
1880						1,353					1,353
Total feet,	2,314	647	18,683	15,647	14,106	1,353	7,335	5,258	1,980	1,056	68,379
" miles	.438	.122	3.538	2.963	2.671	.256	1.389	.995	.375	.20	12.95

SERVICE PIPES LAID TO NOVEMBER 30, 1893.

	FOR CITY.		FOR INDIVIDUALS.		No.
	Feet.	Miles.	Feet.	Miles.	
Prior to 1883	136,518.68	25.855	134,321.52	25.438	5,908
1883	9,237.1	1.749	12,315.1	2.332	459
1884	9,807.5	1.857	14,897.42	2.821	458
1885	7,366.5	1.395	12,822.9	2.428	366
1886	8,673.58	1.642	14,029.58	2.657	438
1887	9,674	1.832	11,418.25	2.162	469
1888	8,814.75	1.669	13,872	2.627	431
1889	10,021.75	1.898	11,264.5	2.133	472
1890	9,300.58	1.761	13,972.9	2.644	449
1891	9,307.5	1.762	14,276.66	2.704	483
1892	10,012.58	1.896	12,803.25	2.424	506
1893	8,616.25	1.631	11,064	2.095	480
	237,350.77	44.94	277,058.08	52.46	10,869

PIPE LINES.

The main line of pipe, from the Holden reservoir to the city, is in good condition and ample in size to supply the demand for many years to come. With the large annual increase in the use of water from the Lynde brook high service system, the present main line of twenty-inch cast iron pipe is inadequate to furnish satisfactory pressure and service in the business section of the city, and in order to improve this service an additional line of main pipe should be laid from the reservoir to the city, through Main street or Park avenue, to intersect with the high service mains as now laid.

The rapid growth of the city, particularly in the northern and western sections, owing to their elevation, must be supplied from the high service system in the near future, and require that action with reference to extending and improving this system should be taken by the committee at an early date.

The twelve-inch low service main line of cement pipe between Lynde brook and Hunt reservoir is in poor condition; also, the twenty, eighteen, and sixteen-inch cement pipe between Hunt reservoir and Montague street, a part of which, by reason of change in location of Leicester street, is not within the present street line and should be abandoned, and a line of twenty-inch cast iron pipe substituted therefor.

This line, when completed to the Lynde brook reservoir, should be connected to the high service system, thus forming the new line of high service recommended in this report.

This line would also supply the amount of low service required from any point along the line through a pressure regulating valve. A part of this line should be laid the coming year.

CONSTRUCTION.

In my last report I called the attention of the committee to the demand for extensions to main lines of water pipe in growing sections of the city, many of which were quite liberally supplied during the past season. This demand continues, and in order to meet the same, a larger appropriation will be required the coming year.

The length of pipe laid in extending main lines of pipe during the year is 31,548 feet, or 5.9 miles.

The length of pipe laid in place of old cement pipe taken out during the year is 29,735 feet, or 5.6 miles.

The number of hydrants added during the year, 120. Total number owned by the city, 1,159; private hydrants, 111. Total number connected with the water works, 1,270. For details of the work done by the department during the year in extending main lines of water pipe and replacing old cement lined pipe with cast iron pipe, with the amount and size of pipe laid in each street, also sizes and kinds of hydrants and gates added during the year, will be found in the tables which are included in this report.

RECOMMENDATIONS.

The following recommendations are respectfully presented for your consideration:

First. That a line of twenty-inch cast-iron pipe be laid in Leicester street, from Montague street to Lynde brook reservoir, to replace the low service cement lined main pipe in that locality, and that when completed to be connected to the high service system.

Second. That the policy of taking out the old cement lined main pipe and replacing it with cast iron pipe of larger capacity be continued until all of it is removed.

Third. That some action be taken by the committee in relation to the subject of a revenue being paid this department for hydrant service, sufficient, at least, to cover the cost of repairs and maintenance.

The attention of the committee is also called to the necessity of some action being taken in regard to location for main lines of high service pipe in the principal business sections of the city. These lines are called for, and extended to a considerable amount each year, and much remains yet to be done in this direction, and in order that these lines may be extended and occupy their proper place in the streets, it is important that this matter be considered in connection with the granting of locations for underground conduits.

ELEVATION OF RESERVOIRS ABOVE MAIN STREET AT CITY HALL.

Lynde Brook Reservoir.

Rollway,	347.67	feet.
Top of dam,	351.67	"
Bottom of pipe,	310.27	"

Holden Storage Reservoir.

Rollway,	269.88	feet.
Top of dam,	274.88	"
Bottom of pipe,	239.78	"

Holden Distributing Reservoir.

Rollway,	177.	feet.
Top of dam,	182.	"
Bottom of supply pipe,	168.45	"
Bottom of waste pipe,	167.75	"
Bell pond, surface of water,	185.5	"
Hunt reservoir,	177.	"
Elevation of Main street at City Hall above tide water,	481.	"
Water pressure at City Hall, high service,	150	pounds.
Water pressure at City Hall, low service,	70	"

SERVICE PIPES.

Four hundred and twenty-nine (429) applications for service pipe have been received ; all but nine of these have been put in, and ten left from last year have been acted upon, making 430 added during the year. These required 8,616 feet of pipe at an expense to the city of $4,462.14 and 11,064 feet for individuals, at an expense of $5,268.73. This includes pipe varying in size from ¾ inch to six inches, and supplies water for use in dwellings, shops, motors, elevators, and stand pipes for fire purposes.

Forty-eight service pipes have been changed either for larger size, or to replace those filled with rust, for which 781 feet of pipe were laid at an expense to the city of $474, and 2,058 feet for individuals, at an expense of $738.58.

Nine thousand, five hundred and seventy-six (9,576) feet of temporary mains have been laid, the persons thus supplied paying the expense of trenching and laying, and for pipe exceeding 100 feet.

One thousand, eight hundred and seventy-five and one-half (1,875½) tons of pipe from R. D. Wood & Co., of Philadelphia, Pa., and forty-seven (47) tons of castings from Holyoke Machine Co., were received during the year.

Value of stock and tools on hand Nov. 30, 1893, $41,883.58.

Bills have been rendered to the city treasurer to the number of 1,754, amounting to $23,348.43. Number of abatements, twenty, amounting to $142.61. Amount of bills in hands of the treasurer, November 30, 1893, $4,377.08. Amount collected during the year, $23,466.93.

Respectfully submitted.

JOHN G. BRADY,
Water Commissioner.

Worcester, Dec. 20, 1893.

REPORT OF THE WATER REGISTRAR.

To the Joint Standing Committee on Water:—

GENTLEMEN:—In compliance with the ordinance relating to water, I herewith submit my tenth annual report as water registrar.

Four hundred and twenty-eight (428) applications for water were received during the year and placed in the hands of the commissioners.

The following bills for water were given to the city treasurer for collection:

For metered water,	19,282	bills, amounting to	$181,844 22
For annual rates,	1,178	bills, amounting to	14,119 91
Total,	20,460	Total amount,	$195,964 13

This shows an increase for the past year of 948 bills and in money $23,037.85.

Total amount of revenue received for the year ending November 30, 1893, $185,564.63. Of this amount $3,019.56 was from uncollected bills in the hands of the treasurer November 30, 1892.

The amount of uncollected bills in the hands of the city treasurer November 30, 1893, was $10,673.44.

During the year the sum of $2,745.63 has been deducted from the amount charged for water rates and metered water, owing to changes from annual to metered rates, vacant tenements and adjustments of bills of water takers.

FINANCIAL STATEMENT.

The quantity of measured water furnished during the year ending November 30, 1893, including water used for street sprinkling, was as follows:

From September, 1892, to March, 1893,	519,523,032 gallons.
From March, 1893, to September, 1893,	539,787,610 "
Total,	1,059,310,642

The number of new meters set during the year was 469, making the total number now in use 9,991.

CLASSIFICATION OF METERS.

KINDS.	SIZES.									
	⅝″	¾″	1″	1½″	2″	3″	4″	6″	8″	TOTAL.
B. and F. Piston, . .	1179	167	13	. .	6	. .	1	. .	. .	1366
Union Rotary	6635	286	135	111	143	67	18	5	1	7401
Crown	15	2	. .	. .	. .	1	. .	. .	. .	18
Desper	805	19	. .	. .	. .	. .	. .	. .	. .	824
Duplex	2	. .	. .	. .	. .	. .	. .	. .	. .	2
Empire	2	. .	. .	. .	. .	. .	. .	. .	. .	2
Gem	2	. .	1	. .	1	3	4	1	. .	12
Hersey	332	26	1	1	2	. .	1	. .	. .	363
Shedd	2	. .	. .	. .	. .	. .	. .	. .	. .	2
Worthington	1	. .	. .	. .	. .	. .	.	. .	. .	1
Total	8975	500	150	112	152	71	24	6	1	9991

Nineteen new elevators were put in the past year, fourteen on high service and five on low service, making the number now in use on high service 128, and on low service 130, a total of 258.

FINANCIAL STATEMENT.

CONSTRUCTION ACCOUNT.

Receipts, balance November 30, 1892,	$4,454 50	
Appropriation,	50,000 00	
	$54,454 50	
Received for labor, meter pipes and fittings,	23,466 93	
	$77,921 43	
Expended,	67,222 34	
Balance, November 30, 1893,		$10,699 09

MAINTENANCE ACCOUNT.

Received for assessment for water, 1892,	$3,019 56	
Received for assessment for water, 1893,	182,545 07	
		$185,564 63
Expended		
Interest on water loan,	$60,750 00	
Transferred to sinking funds,	1,500 00	
		$62,250 00
Cement pipe taken out and replaced with cast iron,	$37,414 24	
Management and repairs,	29,569 22	
		$66,983 46
		$129,233 46
Balance unexpended, transferred to sinking fund,		$56,331 17

A large number of uncollected bills remain in the hands of the city treasurer. Most of these bills are due from the unemployed who have heretofore paid their bills promptly, but at present find themselves unable to do so. These people have asked for more time, which has been granted them, and in no instance has water been shut off this winter for non-payment of water bills. This is in accordance with a vote passed by the committee November 24, 1893, authorizing the registrar to exercise his judgment in relation to shutting off water for the non-payment of bills.

It is possible and probable that in a very few instances, I may have been imposed upon. Allowing that to be the case, it is much better than that one worthy person should be shut off.

I have no doubt the entire amount will be collected when business revives.

RATES.

No change in water rates has been made during the year. In former reports I have recommended a change in rates to manufacturers, and that all should pay the same rate regardless of the quantity used. Under the present financial condition of the department I fail to see how these results can be obtained. No money, that is raised by taxation, is appropriated by the city for the extension of water mains. All money used by the department for that purpose is obtained by loans. The present revenue of the department will, for the next few years, be entirely absorbed by reason of the replacing of cement lined pipe with cast iron, and also the interest and sinking fund account. All of this must be paid for from the water revenue. During the year about $55,000 has been expended in the extension of water mains, and in no single instance has this extension been made where any revenue will be received by the water department for several years to come. I fail to see under these circumstances how rates can be reduced without causing a deficit in the water department which would have to be met by direct taxation.

By a comparison of the figures of the water department of 1883 with 1893, it will be observed that the business of the department has doubled since 1883.

1883.		1893.	
No. of meters in use,	5,197	No. of meters in use,	9,991
Services,	6,367	Services,	10,919
Metered water bills,	9,795	Metered water bills,	19,282
Annual rates,	1,985	Annual rates,	1,178
Total number bills,	11,777	Total number bills,	20,460
Metered water furnished (gals.),	436,915,007	Metered water furnished (gals.),	1,059,310,642

Twenty-one hundred and fifty notices have been sent during the year to water takers, notifying them of an excessive use of water on their premises. While there is no ordinance or rule of the committee requiring this to be done, I am of the opinion that it is for the best interest of the water takers as well as the department, as it saves much friction when large bills are rendered.

Respectfully submitted.
GEORGE E. BATCHELDER,
Water Registrar.

REPORT OF THE CITY ENGINEER.

To the Joint Standing Committee on Water:—

In accordance with chapter 17, section 1, of the City Ordinances, I have inspected the reservoirs at frequent intervals, and the very satisfactory condition of the basins, together with appurtenances, attests to the careful management bestowed.

The completion of the dam at the Holden reservoir, at the beginning of the year, allowed the duty of impounding the spring freshets, and on the 20th day of March the reservoir was filled. This large storage proved of inestimable value, for during the months of June, July, August and September the records kept at the reservoir show but 8.30 inches of rainfall, an amount which is nearly forty per cent. less than the least recorded previous quantity during the same period, since the reservoir came into the city's possession. Similar results are shown at the reservoir at Leicester, the records showing 9.56 inches of rainfall, and yet the amount of water available at the end of the fourth month was above four months' supply. There being two sources from which the supply is drawn, the question often arises, what proportion of the low service is drawn from either reservoir? and with the rapidly growing tendency to adapt the entire supply from Leicester to the needs of the high service, this question becomes of importance. Measures should be taken to determine the demands made upon the Holden service, and a further consideration as to the yield from this shed should receive immediate attention, to become of value in the future development. As a means of obtaining these different measurements I respectfully refer to your consideration the desirability of placing a Venturi meter upon the pipe line at Holden. In connection with the storage capacity of this reservoir, I desire to call your attention to the unfinished table designed to show the number of gallons stored in the basin. During the winter following the completion of the former reservoir, considerable labor and expense was incurred in procuring the necessary data and subsequent formation of a table, showing at a glance the number of gallons stored at any depth below the raceway. Measurements and levels were then taken in anticipation of the enlargement of the reservoir, now accomplished, and the completion of this table to the present needs being primarily of calculation.

I respectfully recommend that this necessary and important matter receive your consideration.

Thanking the committee for the courtesy received, and acknowledging my indebtedness to the water commissioner, Mr. Brady, and the registrar, Mr. Batchelder, this report is most respectfully submitted.

F. A. McCLURE,
City Engineer.

Worcester, Mass., Dec. 6th, 1893.

ANNUAL REPORTS

OF THE

COMMITTEE ON WATER,

THE

WATER COMMISSIONER,

THE

WATER REGISTRAR,

AND THE

CITY ENGINEER,

OF THE

CITY OF WORCESTER,

FOR THE YEAR ENDING NOVEMBER 30, 1894.

WORCESTER:
PRINTED BY CHARLES HAMILTON,
311 MAIN STREET.
1895.

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1895.

WATER COMMITTEE, 1895.

Alderman H. R. KING, *Chairman.*
" M. D. GILMAN.
" R. B. DODGE.
President Common Council A. P. RUGG,
Councilman GEO. M. RICE, 2d.
" E. J. RUSSELL.
" EUGENE BELISLE.

WATER COMMISSIONER,

JOHN G. BRADY.

WATER REGISTRAR,

GEO. E. BATCHELDER.

ANNUAL REPORT

OF THE

COMMITTEE ON WATER.

DECEMBER 20, 1894.

The Joint Standing Committee on Water would herein respectfully submit their annual report for the year ending November 30th, 1894; together with the annual reports of the City Engineer, the Water Commissioner, and the Water Registrar made to this Committee.

For details regarding this department, you are referred to the accompanying reports of the above named officials.

The exceptionally light precipitation of the past year has not only greatly exercised this Committee, but what is of far more consequence, has been one cause of nearly exhausting the supply of water in one of our reservoirs, and necessitated the securing of a temporary supply from another source to tide over till the spring.

The present status of water supply has convinced not only the Committee, but also all who have investigated the matter, that the supposition, which has prevailed heretofore, that we had an ample supply for years to come was not founded on fact.

It is true that with a modified system that would enable us to fill Hunt's reservoir from Holden, that we might equalize the draft upon the two reservoirs to prevent the exhaustion of one against the other; still the fact remains, that we have at present in Holden but a moderate supply for the coming months till its repletion may be expected from the spring rains.

The question of a future supply is not only a momentous subject, but withal a very complicated one.

It will be readily conceded that what would be an ample supply of water five years hence is a problem that could be but imperfectly answered even when one knew the extent to which the city would grow in that time, and the consequent demand for water be increased.

In considering this question, the growth of the city must ever be borne in mind, as well as the variation in precipitation from year to year. Provision must be made for the maximum draft in periods of least yield, as otherwise the system would fail at the most critical time.

Too great reliance should not be placed upon the ability to store water against a dry year, as statistics show we are more liable to have a period of dry years than to have but one between two wet years.

The fact that Lynde Brook reservoir was full a year and a half ago and is now nearly empty, is proof positive that the present draft on it is beyond its capacity.

The remedy recommended by this Committee is a speedy development of the low service system by building the dam at Seagrave's privilege in accordance with the plans already made for that system, thus preparing that system for the increased draft that must be made upon it.

The extension of the pipe line at Foster distributing reservoir to the upper dam so that Hunt's reservoir can be filled from Holden.

The removal of all cement lined pipes as speedily as can be, in accordance with the custom that has prevailed for the past few years.

The substitution of low service for high wherever the pressure of the former is sufficient to do the work.

The completion of this work would enable those in charge to adjust the distribution of the water in accordance with the needs of each service. Something that is impractical under the present arrangements.

It is probable that under such conditions and in ordinary years, the present supply will be adequate for our present needs, but who shall say that we will not have another dry year, or that the city will not grow to greater needs, and the latter faster than the water can be found to satisfy it, unless immediate steps are taken in the matter?

It is not safe to assume that that will not be true, and as according to the figures submitted by the City Engineer, our total yield from our present water sheds is but 1,700,000,000 gallons in a dry year, and as according to the records of the Water Registrar, there was a draft of 1,800,000,000 this year, it is easy to see that the conditions may be such that we may not only be unable to fill our nearly depleted reservoirs, but fail even to keep them where they are unless other supply should be secured.

With this fact before us, and the fact also that the dam at Holden, if ordered, could not be made ready for use much under a year, the Committee have considered the question and recommended the taking by act of Legislature, at an early date, of further high service supply; and in their judgment, that provided by Kettle Brook, so called, is most convenient, most economical, and most advantageous in every way.

It is not known by the Committee what the cost of this undertaking would be, but it is, in their judgment, desirable to take early action looking to the investigation of the matter and acquirement of the stream.

It is also recommended that the city secure from the Legislature the right to take waters from the Asnebumskit and Pine Hill reservoir as a provision for prospective future supply for the low service.

The acquirement of Kettle Brook would add about 722,475,000 gallons to our high service supply, and could be drawn into low service at any time when needed, then making a grand total of about 2,436,726,000 gallons available.

As long as this was sufficient, there would be no need of the Asnebumskit and Pine Hill addition, but we should secure the right to it against future needs. The draft on the water system has doubled in the past ten years. Should that be repeated in the next ten, it is probable that it would be necessary to have such an addition to the supply.

Respectfully submitted.

Alderman F. W. GROUT, Chairman,
Alderman H. R. KING,
Alderman W. C. JEWETT,
President of Common Council T. P. BROWN,
Councilman G. M. RICE, 2d.,
Councilman W. H. BURNS,
Councilman F. J. HOUSTON.

REPORT

OF THE

WATER COMMISSIONER.

To the Joint Standing Committee on Water:—

GENTLEMEN:—I herewith submit for your information, the following report of the Water Commissioner, for the year ending November 30, 1894.

WATER SUPPLY.

The Lynde Brook reservoir, owing to the light rainfall and the heavy draught from this source, which supplies all the high service, and also quite a portion of the low service, has been drawn down to a point which has caused much anxiety, lest the supply from this source would fail to meet the demands made upon it, and to guard against the possibility of failure from this source, steps were taken to obtain a temporary supply from the Kettle Brook system, provided it became necessary so to do.

The present condition of the water supply brings to mind the importance of at once providing an additional storage reservoir for the present, as well as the future growth of the city, particularly through a series of dry years, and in doing this, all sources from which an ample supply can be obtained, should be carefully considered so that when fully developed it will prove to be the proper one, and sufficient for all the needs of the city for many years to come. This subject will be fully outlined by the City Engineer in his report.

RESERVOIRS.

Advantage has been taken of the low state of the reservoirs to remove stumps and vegetable growth from the uncovered surfaces in all the reservoirs, thereby improving the quality of the water.

At Holden the dwelling-houses, barns and sheds on the Foster, Thurston, Chapin, Wadsworth and Chamberlin farms have been removed from the city land, and all the cellars filled up, the grounds graded and fenced with stone wall, making a decided improvement in the general appearance, and removing every possible danger of pollution from this source.

DISTRIBUTION.

The system of distribution has been extended and improved to a large degree in various sections of the city, on both the high and low service lines. During the year, twenty-two thousand nine hundred and fifty (22,950) feet of cast iron pipe have been added, making a total of 138.99 miles of main pipe now in use. Twenty-two thousand three hundred and ninety-five (22,395) feet of cast iron pipe have been laid in place of cement lined main pipe taken out, leaving the amount of cement pipe still in use 9.11 miles.

PIPE LINES.

In my last report, mention was made of the importance of a line of 20-inch cast iron pipe being laid in Leicester street between Lynde Brook reservoir and Montague street in place of the 12-in., 16-in., 18-in. and 20-in. cement lined main pipe between those points. One thousand eight hundred (1,800) feet of which have been replaced with 20-in. cast iron pipe in the present location of Leicester street near Gates lane, and one-thousand (1,000) feet of the 20-in. high service main relaid in the new location of Leicester street at this point.

The completion of the 16-in. main line of low service through June and Highland streets has improved the circulation and pressure for fire service at the north end of the city very materially.

The details of pipe lines laid in other localities, on both the high and low service systems, together with other work done by the department during the year, are given in the tables which are included in this report.

RECOMMENDATIONS.

First. That the whole amount of cement lined pipe now in use be taken out and replaced with cast iron pipe of larger dimensions the coming year.

Second. That a line of low service main pipe be extended through Millbury street to Quinsigamond, to relieve the high service by supplying the greater portion of that territory from the low service system.

Third. That some action be taken in relation to the opening of hydrants by the department for every purpose for which water in large or small quantities can be used, such as puddling trenches, flushing sewers, construction and repair work, street sprinkling for sweeping streets, road rollers, etc., for which no return of the amount of water used is made, and the cost to this department for repairs from such use of hydrants is a large item of expense.

SERVICE PIPES.

Three hundred and sixty-four (364) applications for water have been received. All but five (5) have been put in, and seven (7) left from last year have been acted upon, making three hundred and sixty-six (366) added during the year.

For quantity of pipe used see table of service pipes. Forty-three (43) service pipes have been changed, either for a larger size or to replace those filled with rust, for which five hundred and seventy-three (573) feet of pipe were laid at an expense to the city of $353.84, and two thousand one hundred twenty-two (2,122) feet laid for individuals at an expense of $806.84.

Nine thousand four hundred and sixty-three (9,463) feet of temporary mains have been laid, the persons thus supplied paying the expense of trenching and laying, and for pipe exceeding one hundred (100) feet.

Two thousand six hundred and one (2,601) tons of pipe and special castings from Warren Foundry and Machine Co., of Phillipsburg, N. J., and forty-seven (47) tons of castings from Rice, Barton and Fales Machine and Iron Co., were received during the year.

Value of stock and tools on hand Nov. 30, 1894, $66,972.59.

Bills have been rendered to the City Treasurer to the number of 1,401 amounting to $23,393.94. Number of abatements, 23, amounting to $384.71.

Amount of bills in hand of Treasurer November 30, 1894, $5,898.90.

Amount collected during the year, $21,487.41.

ELEVATION OF RESERVOIRS ABOVE MAIN STREET AT CITY HALL.

Lynde Brook Reservoir.

Rollway,	347.67	feet.
Top of dam,	351.67	"
Bottom of pipe,	310.27	"

Holden Storage Reservoir.

Rollway,	269.88	feet.
Top of dam,	274.88	"
Bottom of pipe,	239.78	"

Holden Distributing Reservoir.

Rollway,	177.	feet.
Top of dam,	182.	"
Bottom of supply pipe,	168.45	"
Bottom of waste pipe,	167.75	"

Bell Pond, surface of water,	185.5	feet.
Hunt reservoir,	177.	"
Elevation of Main street at City Hall above tide water,	481.	"
Water pressure at City Hall, high service,	150	pounds.
Water pressure at City Hall, low service,	70	"

TABLE

Showing the Daily Height of Water in HOLDEN RESERVOIR and the Rainfall for the Year ending November 30, 1894.

Date.	DECEMBER.		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	17.80	.....	22.10	.....	22.00	.....	25.40	.....	30.10	.....	30.20	.....	30.30	.....	28.40	.....	26.95	.....	23.00	.....	20.10	.....	17.77	.....
2	17.78	.....	22.20	.....	22.	.....	25.50	.....	30.10	.....	30.20	.....	30.25	.....	28.30	.....	26.	.....	22.80	.....	20.	.....	17.74	.....
3	17.76	.....	22.30	.....	22.	.....	25.60	.....	30.10	.....	30.20	.....	30.20	.15	28.60	.58	26.10	1.15	22.65	.....	19.90	.....	17.78	.85
4	17.90	2.30	22.40	.....	22.	.....	25.70	.....	30.10	.....	30.20	.....	30.20	.....	28.90	.....	26.14	.....	22.50	.....	19.80	.83	17.88	.....
5	18.10	.....	22.50	.....	22.10	.10	25.90	.....	30.25	.65	30.15	.....	30.15	.....	28.90	.....	26.10	.....	22.35	.....	19.70	.....	18.00	.....
6	18.30	.15	22.60	.15	22.20	.....	26.20	.....	30.25	.....	30.10	.35	30.15	.....	28.80	.....	26.	.....	22.20	.....	19.55	.....	18.15	1.25
7	18.40	.....	22.70	.....	22.30	.....	26.90	.....	30.25	.05	30.25	.....	30.15	.....	28.65	.....	25.85	.....	22.05	.45	19.40	.....	18.25	.....
8	18.50	.....	22.80	.....	22.40	.....	27.30	.....	30.25	.....	30.20	.....	30.10	.....	28.40	.....	25.70	.....	21.95	.....	19.30	.....	18.10	.....
9	18.60	.....	22.85	.....	22.50	.....	28.	.....	30.20	.70	30.10	.....	30.10	.....	28.30	.....	25.60	.....	21.80	.40	19.20	.....	18.00	.30
10	18.70	.....	22.90	.....	22.70	.80	29.	.....	30.20	.....	30.00	.....	30.10	.....	28.20	.....	25.45	.....	21.70	.....	19.10	.....	17.94	.....
11	18.80	.....	23.00	.32	23.	.....	30.	.....	30.20	.....	29.95	.....	30.05	.....	28.30	.30	25.35	.....	21.60	.....	19.20	1.45	17.90	.....
12	18.90	.....	23.05	.....	23.10	.....	30.10	.....	30.20	.....	29.90	.....	30.05	.....	28.45	.....	25.30	.....	21.50	.....	19.20	.....	17.90	.....
13	19.00	.....	23.05	.....	23.20	.....	30.20	.....	30.20	.....	29.85	.....	30.	.....	28.45	.....	25.20	.....	21.30	.....	19.20	.....	17.88	.....
14	19.05	.....	23.10	.....	23.30	.....	30.20	.....	30.30	.70	29.70	.....	29.95	.....	28.30	.....	25.10	.....	21.15	.....	19.10	.05	17.84	.....
15	19.10	.....	23.10	.....	23.40	1.15	30.20	.....	30.30	.....	29.60	.....	29.90	.....	28.20	.....	25.	.....	21.10	.12	19.	.....	17.80	.....
16	19.20	.....	23.10	.....	24.	.....	30.20	.19	30.30	.....	29.50	.....	29.85	.....	28.10	.....	24.90	.....	21.15	.....	18.90	.....	17.80	.....
17	19.30	1.50	23.15	.....	24.20	.13	30.20	.....	30.25	.....	29.50	.....	29.85	.....	28.	.10	24.80	.....	21.10	.22	18.75	.....	17.80	.....
18	19.50	.....	23.20	.....	24.30	.70	30.20	.....	30.25	.....	29.40	.....	29.80	.....	27.80	.....	24.65	.....	21.	.35	18.60	.....	17.80	.08
19	19.70	.....	23.25	.....	24.50	.....	30.20	.....	30.25	.....	29.40	.....	29.80	.....	27.65	.....	24.50	.....	21.10	.....	18.45	.....	17.80	.....
20	19.75	.....	23.30	.....	24.60	.....	30.20	....	30.25	.....	29.50	1.10	29.70	.....	27.40	.....	24.35	.....	21.10	.92	18.30	.....	17.87	.....
21	19.80	.....	23.35	.05	24.70	.....	30.20	.....	30.30	.65	29.50	.....	29.60	.....	27.30	.....	24.25	.....	21.10	.12	18.15	.....	17.87	.42
22	19.85	.....	23.40	.....	24.80	.....	30.20	.....	30.30	.35	29.60	.....	29.50	.....	27.20	.....	24.15	.....	21.05	.....	18.	.....	17.92	.....
23	20.00	.05	23.45	.....	24.90	.....	30.20	.....	30.35	.....	29.80	.....	29.40	.....	27.	.62	24.08	.....	21.	.....	17.85	.....	17.95	.....
24	20.30	.....	23.50	.....	25.	.....	30.20	.98	30.35	.....	29.90	.28	29.30	.....	27.10	.08	23.90	.....	20.90	.....	17.70	.....	18.–	.....
25	20.60	.....	23.55	.50	25.10	.....	30.25	.....	30.35	.....	30.00	1.12	29.15	.....	27.05	.52	23.80	.....	20.80	.....	17.60	.....	18.–	.....
26	20.80	.....	23.60	.....	25.20	.....	30.20	.....	30.35	.07	30.20	.....	29.	.....	26.90	.....	23.70	.....	20.70	.....	17.70	1.02	18.	.....
27	21.00	.....	23.65	.90	25.30	.10	30.15	.....	30.35	.....	30.25	.....	28.90	.....	26.70	.....	23.60	.....	20.60	.....	17.75	.....	17.95	.....
28	21.20	.....	23.70	.....	25.80	.....	30.15	.....	30.35	.....	30.25	.....	28.75	.....	26.60	.....	23.50	.....	20.50	.....	17.75	.....	17.90	.....
29	21.50	.....	23.80	.....	......	.....	30.15	.....	30.30	.....	30.30	1.00	28.65	.....	26.50	.16	23.40	.....	20.40	.....	17.75	.....	17.85	.....
30	21.75	.20	23.90	.....	......	.....	30.10	.05	30.30	.....	30.30	.....	28.50	.....	26.40	.....	23.30	.....	20.25	.....	17.73	.....	17.77	.....
31	22.00	.12	23.95	1.10	......	.....	30.10	.....	......	.....	30.30	.52	......	.....	26.25	.....	23.15	.....	......	.....	17.75	.52	......	.....
Totals ..		4.32		3.02		2.98		1.22		3.17		4.37		.15		2.86		1.15		2.58		3.87		2.90

The rainfall is shown in inches and decimals of an inch. The depth of water is shown in feet and decimals of a foot. Height of rollway 30.10 feet. Rainfall for the year ending November 30, 1894, 31.59 inches.

TABLE

Showing the Daily Height of Water at LYNDE BROOK RESERVOIR and the Rainfall for the Year ending November 30, 1894.

Date.	DECEMBER.		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	21.95	.15	24.12	....	22.40	....	21.80	....	29.50	....	32.15	....	32.50	....	30.30	....	26.55	....	22.15	....	16.50	....	10.35	....
2	21.85	....	24.03	....	22.30	....	21.80	....	29.50	....	32.05	....	32.50	.88	30.20	....	26.45	....	21.95	....	16.30	....	10.28	....
3	21.90	1.88	23.98	....	22.20	.04	21.95	...	29.50	....	32.05	....	32.60	....	30.10	.25	26.35	1.20	21.85	....	16.20	....	10.15	.75
4	22.25	....	23.90	....	22.15	.03	22.35	...	29.40	.54	31.95	.03	32.62	....	30.00	.46	26.35	....	21.65	....	15.90	.27	10.40	....
5	22.60	.16	23.85	....	22.05	....	22.70	....	29.60	....	31.95	....	32.60	....	29.90	....	26.25	....	21.45	....	15.70	.23	10.30	.86
6	22.60	....	23.90	....	21.95	....	23.65	....	29.75	....	31.95	.41	32.60	....	29.80	....	26.20	....	21.25	.38	15.50	....	10.70	....
7	22.60	....	24.00	.16	21.85	....	25.85	.02	29.65	....	32.00	....	32.57	.02	29.70	....	26.05	....	21.10	....	15.25	....	10.80	....
8	22.55	....	23.90	....	21.70	....	27.00	....	29.85	.67	31.95	....	32.47	....	29.60	....	25.85	....	20.85	.52	15.00	....	10.80	.28
9	22.55	.33	23.90	....	21.70	....	27.35	....	29.85	....	31.90	....	32.40	....	29.45	....	25.75	.07	20.75	....	14.80	....	10.80	....
10	22.55	....	23.80	....	21.70	.57	27.60	....	29.75	....	31.80	....	32.40	....	29.30	....	25.65	....	20.55	.04	14.60	1.50	10.70	.32
11	22.55	....	23.70	.14	21.65	.02	27.85	.02	29.88	....	31.70	....	32.35	....	29.20	....	25.55	....	20.30	....	14.60	....	10.70	....
12	22.55	.06	23.60	....	21.50	....	28.15	....	30.05	.54	31.60	....	32.25	....	29.05	.01	25.35	....	20.10	....	14.40	....	10.65	....
13	22.45	....	23.45	....	21.40	.36	28.25	....	30.10	....	31.55	....	32.15	....	28.90	....	25.25	.12	19.90	....	14.10	....	10.55	....
14	22.35	....	23.40	....	21.35	....	28.45	.07	30.15	....	31.47	....	32.05	....	28.80	.20	25.10	....	19.70	....	14.	.21	10.45	.04
15	22.30	.75	23.32	....	21.20	.60	28.55	.15	30.45	....	31.37	....	31.95	....	28.70	....	25.00	.03	19.45	.15	13.75	....	10.35	....
16	22.20	.80	23.22	.16	21.15	....	28.65	....	30.80	....	31.27	....	31.85	....	28.55	....	24.90	....	19.25	....	13.50	....	10.30	....
17	22.50	....	23.30	....	21.05	....	28.70	....	31.05	....	31.15	....	31.77	....	28.40	.25	24.70	....	19.15	.84	13.25	....	10.55	....
18	22.60	.02	23.15	....	20.95	.42	28.80	....	31.20	....	31.10	....	31.67	....	28.20	....	24.50	....	19.05	....	13.	....	10.75	....
19	22.77	....	23.10	.12	21.30	....	28.80	....	31.30	....	31.20	1.03	31.57	....	28.05	....	24.40	....	18.75	....	12.75	....	10.80	.05
20	22.70	....	23.01	....	21.60	.09	28.90	....	31.40	....	31.30	.17	31.47	....	28.00	....	24.25	.07	18.75	1.00	12.50	....	10.75	....
21	22.70	....	23.00	....	21.90	....	28.92	.05	31.50	.51	31.35	.06	31.35	.07	27.90	....	24.10	....	18.50	....	12.25	....	10.60	.40
22	22.60	....	22.85	....	22.10	....	28.92	....	31.80	.30	31.27	....	31.25	....	27.80	.60	23.95	....	18.30	....	12.	....	10.70	....
23	22.54	....	22.70	....	22.15	....	29.03	.95	32.00	....	31.30	.28	31.20	.22	27.70	....	23.80	....	18.20	....	11.75	....	10.70	.02
24	22.60	.06	22.60	....	22.15	....	29.38	....	32.02	....	31.28	....	31.10	....	27.60	.15	23.60	....	18.05	....	11.40	....	10.75	....
25	22.77	....	22.75	.35	22.20	....	29.50	.12	32.02	....	31.80	1.47	30.95	....	27.50	.54	23.40	....	17.85	....	11.15	.20	10.70	.02
26	23.20	....	22.76	....	22.15	.03	29.58	....	32.20	....	31.95	.07	30.85	....	27.45	....	23.25	....	17.60	....	11.15	1.	10.65	....
27	23.95	....	22.70	.32	22.05	....	29.58	....	32.20	....	32.05	....	30.70	....	27.35	....	23.10	....	17.35	....	11.	....	10.55	....
28	24.02	....	22.70	....	21.95	....	29.45	....	32.20	....	32.03	....	30.60	....	27.20	....	22.90	....	17.05	....	10.80	....	10.40	....
29	24.02	.15	22.60	....	......	....	29.40	.12	32.15	....	32.08	.97	30.50	....	27.10	.21	22.75	....	16.90	....	10.70	....	10.20	....
30	24.05	....	22.60	1.20	......	....	29.50	....	32.18	....	32.25	....	30.40	....	26.98	....	22.55	....	16.70	.04	10.50	....	10.	.08
31	24.15	.09	22.50	....	......	....	29.45	....	......	....	32.27	.52	......	....	26.70	....	22.40	....	......	....	10.35	.70	......	....
Totals..		4.45		2.45		2.16		1.50		2.56		5.01		.69		2.67		1.49		2.97		4.11		2.82

The rainfall is shown in inches and decimals of an inch. The depth of water is shown in feet and decimals of a foot. Height of rollway 37.40 feet.
Rainfall for the year ending November 30, 1894, 32.88 inches.

LENGTH AND SIZE OF NEW PIPE LAID DURING THE YEAR ENDING NOVEMBER 30, 1894.

STREET.	LOCATION.	PIPE.		Hydrants.	Gates.	
		Size.	Length in feet.			
Adams Avenue,	From West Boylston Street, east,	8″	447	1	1	
Beeching,	" Pleasant Street, north,	8″	288		1	
Bloomingdale,				1		High Service.
Burncoat,	" North Avenue to Clark Street,	12″	3980	5	8	High Service.
Clark,	" Burncoat Street, east,	8″	412	1	1	High Service.
Downing,	" Woodland to Park Avenue,	12″	1377	3	7	
Englewood Avenue,	" Lovell to Ferdinand Street,	8″	67		1	
Esther,	" Millbury to Vernon Street,	6″	852	2	2	High Service.
Fay,	" Grafton Street to end of Pipe,	6″	354	1	1	High Service.
Ferdinand,	" Englewood Avenue to Circuit Avenue, east,	8″	761	3	2	
High,	" Pleasant Street, south,	8″	108		1	High Service.
Highland,	" Buffalo Street, west,	16″	1190		1	
Hermon,					1	
Hope Cemetery,				1		
Kendall,	" Channing to Hooper Street,	8″	546	2	8	High Service.
Leicester,				2		High Service.
Lincoln Square,	" Main to Union Street,	16″	206		1	High Service.
Locust Avenue,	" Anna Street, south,	8″	287	1	1	
Maxwell,	" Millbury to Vernon Street,	6″	925	2	2	High Service.
Merrifield,	" end of Pipe, south,	8″	550	2		High Service.
North Avenue,				1		High Service.

LENGTH AND SIZE OF NEW PIPE LAID.—*Continued.*

STREET.	LOCATION.	PIPE.		Hydrants.	Gates.	
		Size.	Length in feet.			
Paine,	From Cushing Street, north,	8″	402	1	1	High Service.
Pleasant,	" end of Pipe, west,	12″	3415	6	13	
Prescott,	" Lincoln Square to Ames Plow Co.,	16″	2410	6	10	High Service.
Salisbury,	" West Street to Park Avenue,	12″	900		8	High Service.
"	" Forest Avenue, west,	8″	1545	2	1	
Sargent,				1		
Shattuck,	" end of Pipe, east,	6″	250	1		High Service.
Southgate,				1		
Summer,				1		
Union,	" School Street to Lincoln Square,	12″	962	3	14	High Service.
Wells,	" Plantation Street, east,	6″	548	2	1	
West,	" end of Pipe, south,	6″	168	1		High Service.
			22,950	53	77	

LENGTH AND SIZE OF PIPE RELAID DURING THE YEAR ENDING NOVEMBER 30, 1894.

STREET.	LOCATION.	PIPE.		Hydrants.	Gates.	
		Size.	Length in feet.			
Boynton,	From Institute Road to Salisbury Street,	8″	884		1	
Briden,	" Garden Street to end of street,	6″	306	1		
Brittan,					1	High Service.
Carbon,	" Belmont Street to end of street,	6″	326	1		
Clifton,	" Oberlin to May Street,	8″	1294	3	4	
Garden,	" Prescott to Briden Street,	6″	32		1	
Gardner,	" Canterbury Street west to B. & A. R. R.,	6″	106	1	1	
Gates,	" Main to Hollis Street,	8″	1329	3	2	
Harris Court,	" Jackson Street to end of court,	6″	195			
Highland,	" Main Street to 200 ft. west of Agricultural Street,	16″	4271	3	17	
Hollywood,	" May Street north to end of street,	8″	950	2	4	
Kingsbury,	" " " to Shepard Street,	8″	265			
Leicester,	" Gates Lane, west,	20″	958	1	1	High Service.
"	" " " "	20″	1754	1	7	
Oberlin,	" Woodland to Florence Street,	8″	876		3	
Salisbury,	" Park Avenue, west,	12″	410	1	1	
Sargent,	" Southbridge to Gold Street,	12″	156		3	
Tirrell,	" Main to Freeland Street,	8″	1033	1	2	
Vernon,	" Water to Winthrop Street,	12″	1890		8	
Washington,	" Lamartine to Lafayette Street,	8″	550	1		
West,	" Institute Road to Salisbury Street,	8″	1216		1	
Woodland,	" May to Maywood Street,	12″	2700	3	10	
Wyman,	" Main to Hollis Street,	8″	894	1	1	
			22395	23	68	

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1894.

STREET.	LOCATION.	KIND.	SIZE.	No. of Outlets.	Size of Connections.	Size of Street Mains.	TAKEN UP.
Adams Avenue,	Corner Barbour Avenue,	Chapman.	6″	2	6″	8″	New.
Bloomingdale,	In front of Graton & Knight's,	"	"	"	"	"	" H. S.
Briden,	On west side, at north end of street,	"	"	"	"	6″	4″ Flush.
Burncoat,	On North Avenue,	"	"	"	"	12″	New. H. S.
"	On hill, in front of Curtis' house,	"	"	"	"	"	" " "
"	Opposite Knight's house,	"	"	"	"	"	" " "
"	100 feet north of Pratt's house,	"	"	"	"	"	" " "
"	Opposite Clark Street,	"	"	"	"	"	" " "
Carbon,	At north end of street,	"	"	"	"	6″	"
Clark,	400 feet east of Burncoat Street,	"	"	"	"	8″	" H. S.
Clifton,	Corner May Street,	"	"	"	"	"	"
"	" Oberlin Street,	"	"	"	"	"	"
"	300 feet south of Oberlin Street,	"	"	"	"	"	"
Downing,	Between Woodland and Florence Streets,	"	"	"	"	12″	"
"	" Florence Street and Park Avenue,	"	"	"	"	"	"
"	Corner Park Avenue,	"	"	"	"	"	"
Esther,	" Raymond Street,	"	4″	"	4″	6″	" H. S.
"	" Maxwell Court,	"	"	"	"	"	" " "
Fay,	350 feet north of Grafton Street,	"	6″	"	6″	"	" " "
Ferdinand,	Corner Englewood Avenue, west side,	"	"	"	"	8″	"
"	" Circuit Avenue, west side,	"	"	"	"	"	"
"	350 feet east of Circuit Avenue, west side,	"	"	"	"	"	"
Gardner,	Corner Canterbury Street,	"	"	"	"	6″	4″ Phil.
Gates,	" Main Street,	"	"	"	"	8″	New.
"	500 feet south of Main Street,	"	"	"	"	"	Wooden Post.
"	Corner Esty Street,	"	"	"	"	"	New.
Green,	In yard at Crompton Loom Works,	"	4″	"	4″	"	Flush.
Highland,	Corner Lancaster Street,	"	6″	"	6″	16″	4″ Chapman.
"	" Dean Street,	"	"	"	"	"	6″ Philadelphia.
"	East of Merrifield driveway,	Philadel'a,	"	"	"	"	New.
"	At Sever Street,	Chapman.	"	"	"	"	Wooden Post.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED.—*Continued.*

STREET.	LOCATION.	KIND.	SIZE.	No. of Outlets.	Size of Connections.	Size of Street Mains.	TAKEN UP.
Hollywood,	Opposite Barbour Street,	Chapman.	6″	2	6″	8″	New.
"	On end of pipe, north,	"	"	"	"	"	"
Hope Cemetery,	100 feet south of barn,	"	"	"	"	6″	"
Kendall,	Corner Hooper Street,	"	"	"	"	8″	" H. S.
"	250 feet west of Hooper Street,	"	"	"	"	"	" " "
Leicester,	450 feet east of Gates Lane,	"	"	"	"	20″	" " "
"	Corner Gates Lane,	"	"	"	"	"	4″ Chapman.
"	" Henshaw Street,	"	4″	"	"	"	New. H. S.
"	In yard at Darling's Mill,	"	"	"	4″	6″	" " "
Locust Avenue,	275 feet south of Anna Street, east side,	"	6″	"	6″	8″	"
Main,	Corner Market Street,	"	"	4	"	16″	4″ Flush.
"	100 feet north of Thomas Street,	"	"	"	"	"	" "
"	100 " south " " "	"	"	"	"	"	" "
Maxwell,	Corner Raymond Street,	"	4″	2	4″	6″	New. H. S.
"	" Maxwell Court,	"	"	"	"	"	" " "
Merrifield,	500 feet south of Belmont Street,	"	6″	"	6″	8″	" " "
"	1000 " " " " "	"	"	"	"	"	" " "
Mill,	Near Leicester Street,	"	"	"	"	16″	6″ R. D. Wood.
North Avenue,	In front of A. B. Hall's house,	"	"	"	"	6″	New. H. S.
Paine,	350 feet north of Cushing Street,	"	"	"	"	8″	" " "
Park,	20 feet north of Portland "	"	4″	"	4″	4″	Flush.
Pleasant,	At Hadwen Avenue,	"	6″	"	6″	12″	New.
"	" Richmond "	"	"	"	"	"	"
"	" Lenox Street,	"	"	"	"	"	"
"	" Beeching "	"	"	"	"	"	"
"	Corner new street west of Lenox Street,	"	"	"	"	"	"
"	In front of Kneeland's house,	"	"	"	"	"	"
"	Opposite Abbott Street,	"	"	"	"	8″	Flush.
Prescott,	375 feet north of Lincoln Square,	"	"	"	"	16″	New. H. S.
"	Corner Concord Street,	"	"	"	"	"	" " "
"	" Lexington "	"	"	"	"	"	" " "

Location, Size and Kind of Hydrants, New and Changed.—*Continued.*

STREET.	LOCATION.	KIND.	SIZE.	No. of Outlets.	Size of Connections.	Size of Street Mains.	TAKEN UP.
Prescott,	South end of Wire Mill,	Chapman.	6″	2	6″	16″	New. H. S.
"	Opposite Garden Street,	"	"	"	"	"	" " "
"	In front of Ames Plow Co.,	"	"	"	"	"	" " "
"	" " " Richardson Manfg. Co.,	"	"	"	"	12″	Flush.
"	Corner Garden Street,	"	"	"	"	"	"
Putnam Lane,	Near White, Pevey & Dexter's,	"	"	"	"	8″	6″ Boston.
Salisbury,	" West Street,	"	"	"	"	"	6″ Phil.
"	" Park Avenue,	"	"	"	"	12″	New.
"	Opposite S. A. Burgess' house,	"	"	"	"	8″	"
"	" J. L. Ellsworth's "	"	"	"	"	"	"
Sargent,	In yard of Rice & Griffin Manfg. Co.,	"	"	"			"
Shattuck,	Corner Uxbridge Street,	"	"	"	"	6″	" H. S.
Shelby,	" Mulberry Street,	"	4″	"	4″	"	Post.
Shrewsbury,	Opposite East Park,	"	"	"	"	10″	Boston.
Southbridge,	" Southgate Street,	"	"	"	"	12″	Flush.
Southgate,	In yard of Worcester Woolen Co.,	"	6″	"			New.
Summer,	" " " " Insane Asylum,	"	"	"	6″	6″	"
Tirrell,	400 feet south of Main Street,	"	"	"	"	8″	"
Union,	Corner School Street,	"	"	"	"	12″	" H. S.
"	" Market "	"	"	"	"	"	" " "
"	250 feet north of Bangs Court,	"	"	"	"	"	" " "
Vine,	Corner Cherry Street,	"	4″	"	4″	6″	Flush.
Washington,	300 feet north of Lafayette Street,	"	6″	"	6″	8″	New.
Wells,	250 " east of Plantation Street,	"	"	"	"	6″	"
"	500 " " " " "	"	"	"	"	"	"
West,	Opposite Boynton Hall,	"	"	"	"	"	" H. S.
Woodland,	Corner Downing Street,	"	"	"	"	12″	"
"	300 feet south of Downing Street,	"	"	"	"	"	"
"	Corner Maywood Street,	"	"	"	"	"	"
Wyman,	50 feet south of Main Street,	"	"	"	"	8″	"

TOTAL LENGTH AND SIZE OF PIPE LAID AND NUMBER OF GATES AND HYDRANTS IN USE NOVEMBER 30, 1894.

	2″	3″	4″	5″	6″	8″	10″	12″	16″	18″	20″	24″	30″	Miles.......	Gates......	Hydrants...
Prior to 1894,	10,220	98	92,999	1,487	254,584	157,737	7,734	80,512	62,758	1,980	21,088	11,414	7,060	134.421	1,423	1,270
Laid in 1894,					4,062	14,704		15,790	8,077		2,712			8.588	145	76
Total,	10,220	98	92,999	1,487	258,646	172,441	7,734	96,302	70,835	1,980	23,800	11,414	7,060	143.009	1,568	1,346
Pipe taken up 1894,	326		6,925		5,098	6,161			1,500	254	958			4.019	30	22
Total feet,	9,894	98	86,074	1,487	253,548	166,280	7,734	96,302	69,835	1,726	22,842	11,414	7,060		1,538	1,324
Total miles,	1.873	.018	16.3	.281	48.	31.492	1.464	18.239	13.131	.327	4.326	2.161	1.337	138.99		

CEMENT-LINED MAIN PIPE IN USE NOVEMBER 30, 1894.

	2″	3″	4″	6″	8″	10″	12″	16″	18″	20″	Total.
1864			687				5,335	2,011	1,726	1,056	10,815
1865	144		2,851	1,077	1,523			776			6,371
1866	100				285			971			1,356
1867		647		599							1,246
1868	149		1,604								1,753
1869	1,290		1,033								2,323
1870	190		3,595	2,294	219						6,298
1871	115		449	718	338						1,620
1872			568				2,000				2,568
1873			549	4,784	4,407						9,740
1874			422	790	1,073						2,285
1875				287							287
1877					100	1,353					1,453
1880											
Total ft.	1,988	647	11,758	10,549	7,945	1,353	7,335	3,758	1,726	1,056	48,115
" Miles.	.376	.122	2.227	2.	1.5	.256	1.389	.711	.326	.2	9.11

SERVICE PIPES LAID TO NOVEMBER 30, 1894.

	For City.		For Individuals.		No.
	Feet.	Miles.	Feet.	Miles.	
Prior to 1884	145,755.78	27.604	146,636.62	27.770	6,367
1884	9,807.5	1.857	14,897.42	2.821	458
1885	7,366.5	1.395	12,822.9	2.428	366
1886	8,673.58	1.642	14,029.58	2.657	438
1887	9,674	1.832	11,418.25	2.162	469
1888	8,814.75	1.669	13,872	2.627	431
1889	10,021.75	1.898	11,264.5	2.133	472
1890	9,300.58	1.761	13,972.9	2.644	449
1891	9,307.5	1.762	14,276.66	2.704	483
1892	10,012.58	1.896	12,803.25	2.424	506
1893	8,616.25	1.631	11,064	2.095	430
1894	7,218	1.367	11,035	2.09	366
	244,568.77	46.314	288,093.08	54.55	11,235

Respectfully submitted.

JOHN G. BRADY,

Water Commissioner.

December 20th, 1894.

REPORT

OF THE

WATER REGISTRAR.

To the Joint Standing Committee on Water:—

GENTLEMEN:—In compliance with the ordinance relating to water, I herewith submit my annual report as Water Registrar.

Three hundred and sixty-four (364) applications for water were received during the year and placed in the hands of the Commissioner.

The following bills for water were given to the City Treasurer for collection:

For metered water,	19,939 bills,	amounting to	$182,654 91
For annual rates,	945 bills,	amounting to	12,962 38
Total bills,	20,884	Total amount,	$195,617 29

Total amount of revenue received for the year ending Nov. 30, 1894, $185,940.02. Of this amount $4,534.47 was from uncollected bills in the hands of the Treasurer Nov. 30, 1893.

The amount of uncollected bills in the hands of the Treasurer Nov. 30, 1894 was $16,909.38. Of this amount $6,500.27 was due from the Sewer department and for Street Sprinkling.

During the year the sum of $2,226.34 has been deducted from the amount charged for water rates and metered water, owing to changes from annual to metered rates, vacant tenements and adjustments of bills of water takers.

The quantity of metered water furnished during the year ending Nov. 30, 1894, including water used for street sprinkling was as follows:

From Sept., 1893, to March, 1894,	529,973,072	gallons.
From March, 1894, to Sept., 1894,	535,387,683	"
Total,	1,065,360,755	"

The number of new meters set during the year was 414, making the total number now in use 10,384.

KINDS.	SIZES.									
	⅝ in.	¾ in.	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.	TOTAL.
B. & F. Piston .	1110	134	10	. . .	6	. .	1	. .	. .	1261
Union Rotary .	7058	304	138	119	151	72	19	5	1	7867
Crown	15	2	. . .	. . .	. . .	. .	. .	. .	. .	17
Desper	733	18	. . .	. . .	. . .	. .	. .	. .	. .	751
Duplex	2	. . .	. . .	. .	. . .	. .	. .	. .	. .	2
Empire	2	. . .	. . .	. . .	. . .	. .	. .	. .	. .	2
Gem	2	. . .	1	. .	1	3	4	1	. .	12
Hersey	433	31	1	1	2	. .	1	. .	. .	469
Shedd	2	. . .	. . .	. . .	. . .	. .	. .	. .	. .	2
Worthington .	1	. . .	. . .	. . .	. . .	. .	. .	. .	. .	1
Total . . .	9358	489	150	120	160	75	25	6	1	10384

Seventeen new elevators were put in the past year, twelve on high service and five on low service, making the number now in use on high service 140 and on low service 135, a total of 275.

DWELLINGS, PERSONS, FIXTURES, ETC., ASSESSED FOR WATER IN THE CITY OF WORCESTER.

Dwellings.	Families.	Stores.	Offices.	Saloons.	Markets.	Shops.	Stables.	Persons using.	Sinks.	Basins.	Baths.	Water Closets.	Hose.	Boilers.	Horses.	Cows or Oxen.	Elevators.	Barber Shops.	Hotels.	Schools.	Motors.
10121	20261	1006	746	85	98	505	1855	92983	26070	12000	10827	24315	5462	1586	4757	838	275	64	21	59	44

I desire to call your attention to the present method of putting in main pipes under what is known as the guarantee system.

For several years the city has been putting in long lines of pipe where no revenue can be expected for some years to come.

The present method is for an interested person to obtain a blank petition and agreement, and circulate for signatures of other interested persons, and in most cases assures all who sign that it is a mere matter of form required by the Water Department, and that the signers will not be called upon to pay anything.

After the pipes are laid and bills rendered to the signers, in accordance with the agreement signed by them, trouble commences. We find those who were the most anxious for water are just as anxious to avoid paying for it. The City Treasurer has at present a large number of uncollected bills in his hands against persons who signed the agreement, with no possible way of collecting them, as the parties are not water takers. No agreement should be accepted until each individual signer has been interviewed by the proper authority as to their financial standing as well as to their knowledge of the import of the agreement signed by them.

During the year a large amount of pipe has been laid expressly for fire purposes, where no revenue can or ever will be obtained, consequently the benefit is for the individual or corporation in the form of lower rates of insurance.

If our present system of putting in pipes is continued, and an additional water debt created every year, it is only a question of time when the revenue for water will not be sufficient to meet the running expenses of the department, interest and sinking fund accounts.

RATES.

I am still of the opinion that our water rates should be changed. I have in former reports urged this step to be taken. By our present tariff of rates it is easy to waste more or less water and reduce the size of the bill. It does not seem to be good business policy to encourage water takers to waste water for the purpose of paying less money for more water. In order to more fully call your attention to this subject at this time, I quote from my report of 1892.

"I have hitherto called your attention to our tariff of water rates as operating unjustly to water takers, and especially to small manufacturers. It also places a premium on waste of water. As at present constituted, we have three rates established: namely, one thousand gallons or less per day, twenty-five cents per thousand; for one thousand to five thousand gallons per day, twenty cents per thousand gallons; for from five thousand to fifteen thousand gallons per day, fifteen cents per thousand gallons. For all amounts to any single consumer over fifteen thousand gallons per day, at such special rates as may be fixed by contract with the Committee on Water. It will be observed why our present rates place a premium on the waste of water. For instance, A uses 1,000 gallons of water per day, or 183,000 gallons per six months, and pays twenty-five cents per thousand, amounting to $45.75. B watches his meter and finds that he is going to use just 183,000, and reasons at once, if I use 183,000 gallons of water my bill will be $45.75, but if I waste 500 gallons I will get a twenty-cent rate, and my bill will be $36.70; by wasting 500 gallons of water B's bill is $9.02 less than A's, although B has used 500 gallons more water than A."

This premium for waste of water should be abolished and a new schedule adopted. Our rates for domestic purposes are very low; in fact, lower than in any other city in New England, New Bedford alone excepted.

While I am a strong advocate of low water rates, I can see no prospect for an immediate change in rates for domestic purposes, for the following reasons: Our Interest and Sinking Fund accounts are growing rapidly; no money has been appropriated from the tax levy for Water Works Construction during the past three years; all money used for Water Works Construction has been obtained by a water loan, and an expenditure of thirty thousand dollars per year for replacing cement-lined pipe with cast iron; and with all these expenses paid out of revenue received for water, it will be impossible to reduce water rates for domestic purposes.

When all of the cement pipe is removed there will be a saving of thirty thousand dollars per year of the water revenue, thereby enabling the city to reduce rates all along the line.

Ample revenue should be received from the sale of water to pay interest on water bonds, to contribute to Sinking Funds for the purpose of paying water bonds when due, and for the maintenance account of the department.

The department should be conducted with economy, but not with a view of showing how large a revenue can be accumulated. When the revenue of the department exceeds the amount to be paid, as heretofore mentioned, and as provided for in the Charter, water rates should be reduced.

I trust that the coming year this subject will be given careful consideration, and as a result that a radical change will be brought about.

Respectfully submitted.

GEO. E. BATCHELDER,

Water Registrar.

REPORT OF THE CITY ENGINEER

TO THE

COMMITTEE ON WATER.

To the Joint Standing Committee on Water:—

GENTLEMEN:—In accordance with the provisions of the Ordinances of the City I respectfully present the following report:

A careful inspection at frequent intervals during the year has been made of the dams upon the Lynde and Tatnuck brooks reservoirs and the different structures found to be in excellent condition.

A very valuable and important feature has been added to the main pipe leading from the Holden supply, in the form of a Venturi meter, which will enable all of the water drawn from this source to be accurately measured; and this in connection with the weirs which have been constructed for measuring whatever waste may occur, will determine the value of the entire water-shed. These measurements will prove of the greatest importance in the study of the sheds of the city reservoirs and also in the consideration of adjoining water-sheds which may hereafter be required to further develop the water supply; and with the introduction of similar arrangements at the Lynde Brook reservoir, which your Committee has ordered, not only the separate, but the combined draft can be obtained and other information of great value acquired.

The unfortunate situation in which the City finds itself in respect to its water supply emphasizes what has been considered possible under conditions of a low rainfall. While the precipitation for the past year has been considerably below the average, yet it is higher than the average for the years '82 and '83, and well illustrates the necessity of providing against the dry periods which are certain to recur. The test of experience has proved that in making provision for a water supply, failures have resulted when the calculation has been based upon the assumption of a yield from the available shed of an amount not possible to collect, and for reliability the minimum and not the average fall should be taken as a basis of calculation to ascertain the amount to be expected. Under the present system of distribution a large per cent. of the amount collected in the Lynde Brook reservoir has been drawn into the low service through the Hunt reservoir, which together with the excessive draft by elevators, has resulted in crippling this portion of the service. As the failure has occurred at Lynde Brook, the popular notion exists that this is the point where the City is weak in its water supply, but on the contrary it is the low service that needs augmenting. If the supply from Leicester had been used exclusively for high service purposes and the entire volume for the low service supply had been drawn from Holden, the storage of that reservoir would have been exhausted in September. One of the fruitful sources of depletion in the high service system is the manner in which water is supplied for elevator service. The records of the Water Department show that no less than 149,000,000 gallons have been drawn for this purpose during the past year, and as the reservoir was not filled last spring by several feet, being affected by this draft last year, we have as consequence a loss exceeding 200,000,000 gallons, which would be available to-day had some other motive power been used. As above stated, the Lynde Brook supply is not the point of weakness. If the water from this source is used primarily for high service purposes, without the elevators being attached, there is ample water at the present rate of consumption for a population five times that now supplied, which is sufficient for some years hence, as the future growth will not be in its greater part upon the hills supplied from this service.

If the quantity which it has been customary to draw into the low service is reduced and drawn only in amount to equalize and assist the low service in its proper proportion, and the balance is drawn from the Holden supply, is the present system capable of meeting the demands so made upon it? The rainfall for the past twelve months upon the Lynde Brook watershed has amounted to 32.88 inches, and in looking over the record of rainfall kept at this point for the past twenty years, I find that in the years of 1879 and '80 an average of 36.18 inches of rain fell, and again in the years of 1882 and '83 an average of but 32.37 inches of rain. The records of the Boston Water Works, upon the rainfall on the Sudbury River watershed, show the precipitation for the years of '79 and '80 to average 39.798 inches, of which but 38.6% was collected; and for the years of '82 and '83 an average rainfall of 36.08 inches, of which 40.04% was collected.

As a basis of calculation suppose we assume a dry period, such as experienced in '82 and '83, and that 40% of the rainfall is available. The effective shed of the two reservoirs is about 4,876 acres in area, from which on the above basis of amount collected would produce 1,714,251,784 gallons; and if we were fortunate enough to commence the dry period with two full reservoirs, there would be, at the present rate of consumption, a deficiency of 211 days supply during the second year.

Again, let us assume that the dam is built at the Seagrave site on Tatnuck brook and we are able to add its pondage to the available supply with which to commence the dry period. It has been estimated that this reservoir would impound 468,436,000 gallons, which would still leave a deficiency of 133 days, and if 150,000,000 gallons of the total amount used the past year by elevators were available for other uses, there would still be a deficiency of ninety days supply. I believe that this presentation is sufficient without further elaboration to show the necessity of an increase in the water supply of the City, and while I anticipate that it may be thought that this presents an extreme case, yet long continued meteorological observations show that these dry periods are certain to recur, and that no water supply is reliable which fails to provide for them. It should also be borne in mind that in some years of a greater rainfall than that used in the above calculation a smaller per cent. is collected.

DISTRIBUTION.

The distribution system, as it exists to-day, is very much in need of correction. The requirements consequent upon the growth of the City being greatly in excess of the capacity of many pipes to supply in a satisfactory manner. It is simply the result of a rapidly growing community and the inability of a portion of the system laid thirty years ago to meet the demands made upon it to-day. Several of the outlying districts, through necessitation, that now are dependent upon the low service, should be transferred to the high service system for a suitable fire protection, while some of the more central localities that now are supplied from the high service, should be attached to the low service. All of the old cement pipe should be replaced with cast iron of greater capacity as rapidly as circumstances will permit, in order to meet any possible demands in case of a serious fire. The attachment of the districts that could properly be supplied from the Holden source, with the consequent increased draft upon this system, should receive careful consideration ; for with the draft as it exists to-day the loss of pressure is seriously felt in many localities. Large pipes of sufficient capacity to generously maintain the required maximum volume and effective head are of the utmost importance as a fire protection, for the lack of these has cost several cities most dear.

An experiment was made on November 26 to determine the Monday draft and the maximum hourly draft on that day upon the Holden supply, which the following table will explain :

DATE.	HOUR.	METER READING.	DRAFT IN CU. FT.	REMARKS.
Nov. 26.	6 A. M.	28,076,000		
	7 "	28,095,000	19000	
	8 "	28,124,000	29000	
	9 "	28,155,000	31000	Draft for 24 hours, 3,291,200 gals.
	10 "	28,191,000	36000	" 6 A.M. to 6. P.M., 2,296,360 "
	11 "	28,215,000	24000	" 6 P.M. to 6 A.M., 994,840 "
	12 M.	28,243,000	28000	
	1 P. M.	28,263,000	20000	Max. draft at rate of 6,462,720 gallons per 24 hours.
	2 "	28,290,000	27000	
	3 "	28,315,000	25000	
	4 "	28,339,000	24000	
	5 "	28,362,000	23000	
	6 "	28,383,000	21000	
Nov. 27.	6 A. M.	28,516,000	133000	

As seen by the table the maximum hourly draft is nearly double the rate for the 24 hours, and in case of a serious fire the maximum amount might be increased to double or a greater volume, which illustrates the necessity of having pipes of ample capacity.

RECOMMENDATIONS.

Upon considering the situation existing to-day, I am clearly of the opinion that the City is in no way provided to guard against periods of extreme drouth. Should the present be followed by another season of low rainfall an exigency will undoubtedly arise that will tax the best efforts to mitigate, and I earnestly recommend that the necessary measures be taken to provide the right to take additional water should necessity require. Perhaps it may be pertinent at this time to briefly outline what is required, in my opinion, to improve the system of the City's water supply. I believe that as soon as possible the 30-inch main pipe should be extended from a point near the distributing reservoir to the main dam at Holden, and advantage taken of the forty pounds additional pressure which this would ensure to assist the increased draft which must come from this source to relieve the Leicester reservoir, and at the same time replace the remaining portion of the old cement pipe with iron of proper sizes to provide for the increased pressure. Construct a new dam at the Seagrave site on Tatnuck brook of sufficient height to flow nearly to the outlet pipe from the present reservoir.

Dispense with the small Hunt distributing reservoir and convert what is now the low service pipe from the Leicester system into a second high service pipe, to be extended upon the west side of the City, and from which provide the adjoining hill district with a good fire protection, which they lack to-day. Continue this extension to the northerly part of the City and connect with the present high service pipes, thereby more than doubling the efficiency of the system as it now is. Disconnect the Millbury Street and Quinsigamond district from the high service and supply the hill in the lower portion by an extension from College Street. Should the elevator service be disconnected from the Leicester supply, there will be available a large volume of water from this reservoir to assist the low service, which can readily be accomplished through connections with that system at suitable points controlled by gates and relief valves, by which the amount so drawn can be regulated, and the entire system operated as a whole. With the introduction of the meter now ordered by your committee for the Lynde Brook service in connection with the existing one at Holden, the proportionate supply from each reservoir can be regulated to a nicety. The conditions would then exist for an intelligent control of the entire available amount, avoiding the possible depletion of one reservoir at the expense of the other. As the Leicester supply can always be drawn into the low service, this portion of the system should be zealously guarded and free from the conditions of compulsory draft into low service through weakness of distribution. To strengthen this portion of the service, I think it advisable to lay an additional main supply pipe from the proposed lower reservoir at Holden, of sufficient capacity, to relieve the present main of the 16-inch distribution pipe at June Street, and enter the City by way of May Street, connecting with the 16-inch pipes in Park Avenue and Main Street, and continuing its course by way of Hammond Street and Quinsigamond Avenue to the junction of Cambridge Street. By this plan provision will be made for ample volume and pressure for the New Worcester, Island and Quinsigamond districts, and in connection with the newer existing mains from the Holden supply, the entire City will then be well provided for, ready at all times to meet any demands; and when occasion shall require, the waters of Kettle Brook and the Asnebumskit can add their stores by gravitation to pulsate through the veins and arteries of a greater Worcester. Such, in brief, is a plan I respectfully submit for your consideration, believing that the interests of the City urgently require the fortifying of its water supply. I am indebted to the Water Registrar, Mr. Batchelder, and the Commissioner, Mr. Brady, for information in regard to the Water Department. I also desire to recognize the valuable aid rendered by the assistants in the Engineering Department, and thanking the Committee for the courtesy received from them while prosecuting work under their direction, this report is respectfully submitted.

FRED'K A. McCLURE, *City Engineer.*

WORCESTER, Dec. 20, 1894.

ANNUAL REPORTS

OF THE

WATER COMMISSIONER,

The Water Registrar, and the City
Engineer,

OF THE

CITY OF WORCESTER,

FOR THE

YEAR ENDING NOVEMBER 30, 1895.

THE NEW YORK
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WORCESTER, MASS.:
PRESS OF F. S. BLANCHARD & CO.,
154 FRONT STREET.
1896.

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WATER COMMITTEE, 1896.

Alderman A. A. WHITE, President Board of Aldermen,
Alderman H. R. KING,
Alderman M. D. GILMAN,
Councilman E. M. WOODWARD, President Common Council,
Councilman E. L. BELISLE,
Councilman C. H. ELLSWORTH,
Councilman F. D. JOHNSON.

WATER COMMISSIONER.

JOHN G. BRADY.

WATER REGISTRAR.

GEO. E. BATCHELDER.

ANNUAL REPORT OF THE WATER COMMISSIONER.

To the Honorable City Council:

The report required by the ordinances in the month of December, from the water commissioner, for the year ending with the 30th day of November, 1895, is herewith submitted :—

RESERVOIRS.

I am pleased to report that every branch of the department, including the reservoirs and grounds connected with them, are in excellent condition at the present time.

The Venturi meters, ordered late last season, have been placed in position on the main lines of pipe leading from the Lynde brook reservoir, and with the one placed on the Holden supply main last season, enable us to obtain accurate measurements of all the water used by the city.

WATER SUPPLY.

The water supply at the present time is in a much more satisfactory condition than at a corresponding date last year. At that time, owing to the severe drouth, and the necessary increased draft from the reservoirs during the dry period, the supply was nearly exhausted, necessitating the securing of a temporary supply from another source to provide for the needs of the city during the winter months.

This supply was obtained from the Kettle brook system and conveyed through a wooden conduit into the water-shed of Lynde brook reservoir. This system has since been secured as a permanent addition to the water works of the city, and connected with the Lynde brook reservoir by a 30-inch cast iron pipe conduit, thereby giving assurance of an ample supply to meet the demands of the present and near future.

DISTRIBUTION.

The policy inaugurated some years ago of taking out the old cement-lined main pipe and replacing it with cast iron pipe of larger capacity, has been continued, and much improvement accomplished in this direction during the year. Plans and estimates have been prepared for the further improvement of the pipe system, which will be introduced and carried forward as rapidly as possible, so that when completed, it will constitute a much improved pipe system, and ample in size to provide for the future growth of the city.

The length of pipe laid in extending the mains during the year was 3.88 miles, and the total length of main pipe now in use, 143.4 miles. The amount laid in place of worn out cement pipe taken up or abandoned was 5.53 miles, leaving a total of the old cement pipe still in use of 4.3 miles.

Early in January proposals were issued for furnishing the department 2,671 net tons of cast iron water pipe and 3½ net tons of special castings, the price per ton to include delivery in Boston & Albany railroad yard, Worcester, Mass.

Bids were received from three parties, viz.:

Warren	Foundry	Co.,	pipe,	$18 00	per ton;	castings,	$40 00	per ton.
McNeal	"	"	"	18 35	"	"	40 00	"
Reading	"	"	"	18 55	"	"	40 00	"

Contract was awarded Warren Foundry Co., the lowest bidder.

In July, proposals were again issued for about 1,200 net tons of 24-inch cast iron pipe and fifty tons special castings, to be used in relaying the main line of pipe in Main street, between Gates lane and Lynde brook reservoir, the pipe and specials to be delivered on New York & New England railroad side track South Worcester, Mass.

Bids were received from three parties, viz.:

Warren Foundry Co.,	pipe,	$20 00	per ton;	castings,	$45 00	per ton.
McNeal	"	"	20 00	"	50 00	"
Anniston	"	"	19 90	"	40 00	"

Contract awarded to Anniston Foundry Co., the lowest bidder.

The details of the amount of pipe laid and relaid, number of gates and hydrants added during the year, also the rainfall at the reservoirs, together with the elevations of the different reservoirs connected with the water works, are given in the following tables, which are included in this report:

TABLE

Showing the daily height of water in HOLDEN RESERVOIR and the rainfall for the year ending November 30, 1895.

Date.	DECEMBER.		JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	17.75	......	18.30	......	21.65	......	20.78	......	27.30	......	30.98	......	30.94	.39	30.33	.45	29.25	......	27.40	......	25.25	......	30.00	1.90
2	17.70	.62	18.30	......	21.65	......	21.05	......	27.40	......	30.96	......	31.00	......	30.30	......	29.20	......	27.45	......	25.10	......	30.10	......
3	17.65	......	18.25	......	21.65	.10	21.20	.20	27.65	.15	30.94	......	31.00	......	30.28	......	29.10	......	27.30	......	25.00	......	30.25	.48
4	17.60	......	18.15	......	21.66	......	21.30	......	27.85	......	30.92	......	31.10	.77	30.25	......	29.05	......	27.30	......	24.90	......	30.20	......
5	17.50	......	18.05	......	21.65	......	21.40	......	28.00	......	31.02	.58	31.18	......	30.23	......	29 00	......	27.25	......	24 80	......	30.15	......
6	17.40	......	18.10	......	21.60	......	21.45	......	28.12	......	31.02	......	31.20	......	30.20	......	29.00	......	27.15	......	24.70	......	30.10	......
7	17.45	......	18.20	......	21.55	......	21 50	......	28.30	......	31.02	......	31.20	......	30.15	......	28.92	1.05	26 95	......	24 60	......	30.15	......
8	17.40	......	18.80	......	21.55	......	21.65	......	28 55	......	30.98	......	31.16	......	30.10	......	28.85	......	26 90	......	24.55	......	30 15	......
9	17.40	......	19.05	1.15	21.50	......	21.80	.66	29.35	1.20	30 96	......	31.11	......	30 10	......	28.85	......	26.87	......	24.40	......	30.10	......
10	17.40	.46	19.25	......	21.55	.70	22.00	......	30.30	.25	30.94	......	31.08	......	30.10	.86	28.80	......	26.80	.85	24.30	......	30.25	.16
11	17.35	......	19.45	......	21.55	......	22.35	......	30.65	......	30 90	......	31.00	......	30.10	......	28.75	......	26 85	......	24 20	......	30.15	......
12	17.35	.64	19.80	......	21.53	......	22.48	.14	30.75	......	30.88	.71	30.95	......	30 05	......	28.65	......	26.80	.52	24.10	......	30.10	......
13	17.50	......	20.10	......	21.50	......	22.55	......	30.75	......	31.02	......	30.84	.30	30 05	.85	28.58	......	26.75	......	27.00	......	30 10	......
14	17.60	......	20 38	.70	21.47	......	22.65	.85	30.77	......	31.01	......	30.80	......	30.05	......	28.50	......	26 60	......	27.50	7.35	30.10	......
15	17.70	......	20.50	......	21.40	......	23.50	......	30.75	3.00	31.02	.58	30.75	......	30.05	......	28.40	......	26 45	......	28.10	......	30 40	2.50
16	17.80	......	20.62	.50	21.35	......	24 22	.06	30.77	.88	31.06	......	30.65	......	30.05	......	28.82	......	26.40	......	28 33	......	30.45	......
17	17.90	......	20.75	......	21.30	......	24.40	......	30.85	......	31.08	......	30.60	......	29.90	.36	28.30	......	26 30	......	28.50	......	30.50	......
18	18.00	......	20.79	.35	21.25	......	24.50	......	30.75	......	31.07	.16	30.50	......	29.90	......	28.40	1.62	26.20	......	28.65	......	30.50	1 00
19	18.10	......	20.85	......	21.20	......	24.65	......	30.77	......	31.05	......	30.45	......	29 60	......	28.35	......	26.15	.25	28 75	......	30.40	......
20	18.16	......	20.90	......	21.15	......	24.75	......	30.80	......	31.02	......	30.35	......	29.75	......	28.25	.05	26 10	......	28.85	.05	30.35	......
21	18.20	......	20.95	......	21.10	.05	24.90	......	30.77	......	30.96	......	30.25	......	29.65	......	28.15	......	26.05	......	28.90	......	30.35	......
22	18.25	......	21.08	.24	21.05	......	25.10	......	30.80	......	30.93	......	30.15	.03	29 60	.40	28 12	......	25.95	......	28 95	......	30.25	......
23	18.25	......	21.20	......	21.01	......	25.15	......	30.95	.12	30.88	......	30.08	......	29.60	......	28.05	......	25.85	......	29.00	......	30 25	......
24	18.30	......	21.25	......	21.	......	25.40	......	30.96	......	30 83	......	30.04	......	29 50	......	28.00	......	25.75	......	29.00	......	30.35	.91
25	18.30	.12	21.35	......	20.98	......	25.59	.10	30.93	......	30.78	......	29.93	.58	29.40	......	27.95	.32	25 65	......	29.00	......	30.30	......
26	18.34	......	21.60	......	20.90	......	26.00	......	30.97	......	30.78	......	29.90	......	29.30	......	27 90	......	25.60	.22	29 05	......	30 30	.26
27	18.30	......	21.70	.84	20.85	......	26.10	......	31 02	.22	30 79	......	29.88	......	29.20	......	27.80	......	25 60	......	29.05	......	30.50	.93
28	18.30	1.08	21.65	......	20.80	......	26.35	.12	31.01	......	31.05	1.26	30.10	1.30	29.20	.63	27.75	......	25.40	......	29.10	......	30.40	......
29	18.30	......	21.60	......	.....	......	26.73	......	31.01	......	31.00	......	30.14	.76	29.20	......	27.70	......	25 30	......	29 10	......	30.32	......
30	18.30	......	21.60	.22	.....	......	26.97	.09	31.	.11	30.98	......	30.25	.20	29.40	1.50	27.60	......	25.30	.80	29.10	......	30.36	......
31	18.30	......	21.65	......	.....	......	27.30	......	.....	......	30.95	......	.....	......	29.35	......	27.50	.24	.....	......	29 10	......	......	......
Totals,		2.92		4.00		.85		2.22		5.43		3.29		4.33		5.05		3.28		2.64		7.40		8.14

The rainfall is shown in inches and decimals of an inch. The depth of water is shown in feet and decimals of a foot. Height of rollway, 30.10 feet.
Rainfall for the year ending November 30, 1895, 49.55 inches.

TABLE E

Showing the daily height of water in LYNDE BROOK RESERVOIR and the rainfall for the year ending November 30, 1895.

Date.	DECEMBER.		JANUARY		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.	Water.	Rainfall.
1	9.85	......	12 10	......	21.87	......	20 90	......	27.05	......	33.55	......	33 30	.48	32 10	......	30.80	.08	28.88	......	25.87	......	30.00	1 92
2	9 65	.47	12.40	......	21.87	.10	21.05	.83	27 15	......	33.55	......	33.37	......	32.10	......	30.75	......	28.85	......	25.80	......	30.30	......
3	9.50	......	12.65	......	21.87	......	21.45	......	27.25	.15	33.50	......	33 35	......	32 05	......	30 65	......	28.83	......	25.72	......	30.50	.52
4	9 30	......	12.95	......	21.87	.05	21.55	.31	27.35	......	33 50	......	33.35	.56	32 00	.14	30 55	......	28.67	......	25.58	......	30 63	......
5	9.15	......	13.15	......	21.87	......	21 60	......	27.53	......	33 45	......	33.40	......	31.90	.30	30.53	......	28.60	......	25.42	......	30 70	......
6	9.00	......	13.40	.71	21 87	......	21.60	......	27 70	......	33.45	......	33 40	.18	31.90	.14	30.40	......	28.45	......	25.30	......	30 75	......
7	8.90	......	13.70	......	21 87	......	21 60	.12	27.83	......	33 40	......	33.40	......	31.80	......	30.33	2 00	28.35	......	25 20	......	30.75	......
8	8.75	......	14.65	.22	22 00	.27	21.70	.50	27.95	1 28	33 40	......	33.35	......	31 77	......	30 60	......	28.25	......	25.05	.07	30.77	......
9	8.60	.44	15.50	......	22.20	......	22 15	......	28.85	.23	33.40	......	33.27	......	31.70	1.11	30.55	......	28.12	.92	24.90	......	30.80	.16
10	8.45	......	16.0	......	22 25	......	22 55	......	29 95	......	33 35	......	33 22	......	31.80	......	30.43	......	28.10	......	24.80	......	30 83	......
11	8 30	.44	16.60	.90	22 30	......	22 80	......	30.30	......	33 30	......	33 15	......	31.70	......	30.33	......	28.00	......	24.65	......	30.85	......
12	8 20	.23	17 60	......	22 40	......	23.00	02	30 45	......	33.25	.73	33.10	......	31.67	......	30 25	.08	27.98	.40	24 50	......	30.85	......
13	8 50	......	18.50	.10	22 45	......	23.10	......	30 55	......	33.35	......	33.00	.08	31.57	.46	30.15	......	27 88	......	25.35	2.15	30.85	......
14	8.80	......	19.02	......	22.50	......	23.70	.80	31 35	2.15	33 35	......	32 95	......	31.57	.10	30.05	......	27.75	......	29 25	4.50	30.78	......
15	9 00	......	19.45	......	22 45	......	24 80	......	32.50	.25	33.40	.47	32.90	......	31.55	......	29.95	......	27.65	......	29.70	.63	31 55	2.43
16	9 12	......	19.80	.31	22 40	......	25.10	.08	32.90	......	33.45	......	32.77	......	31 47	.25	29 88	......	27.53	......	29.80	......	32.50	......
17	9.30	......	20 17	......	22.33	......	25 15	......	33.10	......	33.43	......	32.70	......	31 50	......	29 75	......	27.40	......	29 90	......	32.65	1.10
18	9.65	......	20.40	......	22.20	......	25 20	......	33 20	......	33 43	.18	32.65	......	31 40	......	29.65	2 18	27.30	.23	29.88	......	33 30	......
19	9 65	......	20.55	.20	22.10	......	25.25	......	33.25	......	33 48	......	32.53	......	31.34	......	30.00	......	27.18	......	29 88	......	33 60	......
20	9 60	......	20 70	......	21 97	......	25 25	......	33 30	......	33 40	......	32.44	......	31.25	......	29 95	.02	27.08	......	29 85	......	33 70	.24
21	9.55	......	20 85	......	21 90	.05	25 30	......	33 30	......	33 40	......	32 32	......	31.20	.52	29.85	......	26 95	......	29 80	......	33.80	......
22	9.50	......	21 03	.21	21.75	......	25.50	......	33.30	.13	33 38	......	32 25	......	31 15	......	29 75	......	26.80	......	29 75	......	33.90	......
23	9.40	......	21.20	......	21 65	......	25 60	......	33.40	......	33 33	......	32 15	......	31 10	......	29.65	......	26.70	......	29 75	......	33 95	......
24	9.45	......	21 35	......	21.54	......	25.80	......	33.40	......	33 30	......	32.10	......	31.00	......	29.55	......	26 60	......	29 68	......	34.10	.32
25	9.85	.27	21.45	......	21.40	......	26 05	.10	33 41	.02	33.27	......	32.00	.20	30.87	......	29 45	......	26.43	......	29.65	......	34.20	......
26	10 20	......	21.55	.87	21 27	......	26.30	.02	33.41	......	33.23	.07	31.97	......	30 77	......	29 35	......	26 30	.18	29.60	......	34.45	1.16
27	10.50	1.10	21.68	......	21.22	......	26 50	......	33.45	.20	33 20	.66	31 84	1.25	30.65	.90	29 25	......	26.17	......	29 56	......	35.00	......
28	10 85	......	21 73	......	21.10	......	26.70	.28	33.48	......	33 33	......	31 98	.79	30.67	......	29 10	......	26 05	......	29.53	.08	35.20	......
29	11 20	......	21.80	.12	......	......	26 80	.07	33.48	......	33.33	......	32 03	.15	30 70	......	29 02	.61	26.95	......	29 48	......	35 25	......
30	11 45	......	21.80	......	......	......	26.95	......	33 53	.13	33 38	......	32.05	.12	30 52	2.08	29 00	......	25.95	.78	29.43	......	35 35	......
31	11.80	......	21.85	......	......	......	26.95	......	......	......	33.30	.26	......	......	30 85	......	28.95	.70	......	......	29.35	......	......	......
Totals,	2.95		3.64		.47		2 58		4 54		2 37		3.81		6.00		5.67		2 51		7.43		7.85	

The rainfall is shown in inches and decimals of an inch. The depth of water is shown in feet and decimals of a foot. Height of rollway, 37.40 feet. Rainfall for the year ending November 30, 1895, 49.82 inches.

Length and Size of New Pipe Laid During the Year Ending November 30, 1895.

STREET.	LOCATION.	PIPE.		HYDRANTS.	GATES.	
		Size in Inches.	Length in Feet.			
Bancroft avenue,	From Lincoln street, west,	12	1,429	2	3	High service.
Bancroft,	" Bluff to Kingsbury street,	6	396	1	1	
Beeching,	" End of pipe, north,	8	400	1		
Beechmont,	" Mt. Hope street, north,	8	256		1	
Cambridge,	" Webster square to Knowlton avenue,	12	545	1	1	
Chandler,				1		
Circuit avenue, east,	" Ferdinand to Isabella street,	12	321			
Clement,	" Main to Beaver street,	8	700	2	2	
Everard,	" Catharine to Vinson street,	8	600	1		High service.
Fairview terrace,	" West Boylston street, east,	8	276	1	1	
Francis,	" " " " "	8	902	2	1	
Genesee,	" Highland to Mt. Hope street,	8	1,191	1	2	
Grafton,	" Union avenue to Millbury avenue,	12	775	2	5	High service.
Holmes,	" End of pipe, east,	6	180	1		" "
Holy Cross College,				3		
Isabella,	" Englewood avenue to Circuit ave., east,	8	620	3	2	
Kettle brook conduit,	" Kent's pond to Lynde brook reservoir,	30	1,415		1	
Knowlton avenue,	" Cambridge street, west,	8	537	1	1	
Lenox,	" Pleasant street, north,	8	745	2		
Lowell,	" End of pipe to Freeland street,	6	154	1	1	
Marble,	" Main to Beaver street,	8	836	1	2	
May,	" End of pipe to Lovell street,	12	536	1	2	
Millbury,	" Worth to Ward street,	12	1,187	4	8	
Nixon avenue,	" Cambridge street, west,	8	503	1	1	
North Merrick,	" Elm to Cedar street,	8	358		2	
Shaffner,	" Lincoln to Uxbridge street,	8	932	2	2	High service.
Stafford,	" Leicester to Young street,	12	1,327	3	5	
Union avenue,	" Houghton to Grafton street,	16	793	2	4	High service.
Uxbridge,	" Shaffner to Washington avenue,	12	1,312	3	6	" "
"	Street connections,	8	136			" "
Vinson,	From Everard to Stanton avenue,	8	238	1	1	" "
Woodbine,	" Oliver to Beaver street,	8	918	2	2	
			20,518	46	57	

LENGTH AND SIZE OF PIPE RELAID DURING THE YEAR ENDING NOVEMBER 30, 1895.

STREET.	LOCATION.	PIPE.		HYDRANTS	GATES.	
		Size in Inches.	Length in Feet.			
Austin,	From Bellevue to Winslow street,	12	400	1		
"	" Bellevue to Dewey street,	8	750			
"	" Winslow to Newbury street,	8	1,040	2	2	
Canterbury,	" Gardner street, north,	12	655	1	3	
Charlotte,	" Woodland street to Park avenue,	12	1,357	3	6	
Freeland,	" Main to Tirrell street,	12	1,086	1	4	
Gardner,	" Southgate to Canterbury street,	12	320	1	2	
Grand,	" Southgate to Tainter street,	16	775	2	8	
"	Street connections,	12	38			
Leicester,	From Winchester ave. to Lynde brook reservoir,	24	8,683	2	7	
"	" Montague street to Gates lane,	20	950	2	3	
"		12	53			
Milk,	" Franklin street, east,	6	176	1	1	
Mill,	" Park avenue to 64 Mill street,	16	1,126	1	4	
Pearl,	" Main to Chestnut street,	12	647	2	5	
Piedmont,	" Austin to Pleasant street,	12	962	2	5	
Pleasant,	Under Beaver brook,	12	60			
Salisbury,	From Boynton to Forest street,	12	3.506	6	14	High service.
Shrewsbury,	" Lyon street, east,	16	1,330	3	4	
Southbridge,	" End of 12 in. pipe to Cambridge street,	16	2,020	4	10	
Southgate,	" Southbridge to Grand street,	16	1,857	2	4	
Walnut,	" Main to Chestnut street,	12	748	3	5	
Washburn,	" Southbridge to Colton street,	12	679	1	3	
			29,218	40	90	

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1895.

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Austin,	Opposite Winslow street,	Chapman.	6	2	6	12	4 in. Chapman.
"	Corner Queen street,	"	6	2	6	8	6 in. Philadelphia.
"	Corner Piedmont street,	"	6	2	6	8	4 in. Chapman.
Baker,	Corner Montague street,	"	6	2	6	8	4 in. "
Bancroft avenue,	Opposite Mr. Reed's house,	"	6	2	6	12	New. H. S.
" "	Opposite Mr. Tylee's house,	"	6	2	6	12	" "
Bancroft,	Corner Kingsbury street,	"	6	2	6	6	"
Beeching,	118 feet north of north line of Mr. Howland's house,	"	6	2	6	8	"
Cambridge,	Opposite Nixon avenue,	"	6	2	6	12	"
Canterbury,	279 feet north of north line of Gardner street,	"	6	2	6	12	"
Chandler,	300 feet east of Lovell street,	"	6	2	6	24	"
Charlotte,	238 feet east of Park avenue,	"	6	2	6	12	"
"	463 feet east of Park avenue,	"	6	2	6	12	Boston.
"	42 feet east of west line of Woodland street,	"	6	2	6	12	"
Clement,	Corner of Main street,	"	6	2	6	8	New.
"	Corner of Beaver street,	"	6	2	6	8	"
Everard,	Corner of Vinson street,	"	6	2	6	8	" H. S.
Fairview terrace,	On east line of Mr. Lincoln's lot,	"	6	2	6	8	"
Francis,	On west line of People's Church lot,	"	6	2	6	8	"
"	On west line of J. P. Taber's lot,	"	6	2	6	8	"
Freeland,	Opposite No. 5,	"	6	2	6	12	"
Gardner,	Corner Southgate street,	"	6	2	6	12	"
Genesee,	On north line of W. A. Gile's lot,	"	6	2	6	8	"
Grafton,	Corner Union avenue,	"	6	2	6	12	" H. S.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1895.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Grafton,	Corner Millbury avenue,	Chapman.	6	2	6	12	New. H. S.
Grand,	On west side, corner Canterbury street,	"	6	2	6	16	"
"	West side B. & A. R. R., opp. Knowles Loom Works,	"	6	2	6	16	"
Harvard,	Corner George street,	"	6	2	6	8	Flush.
"	On west side, north of Bowdoin street,	"	6	2	6	8	"
Hermon,	In front of Union Water Meter Co.'s shop,	"	6	2	6	12	U. W. M. Co.
Holmes,	450 feet east of Cambridge street,	"	6	2	4	6	New. H. S.
Holy Cross College,	North of building,	"	6	2	6	6	"
" " "	South of building,	"	4	2	4	6	Flush.
" " "	Near centre of main building,	"	4	2	4	6	New.
Isabella,	Corner of Englewood avenue,	"	6	2	6	8	"
"	259 feet west of west line of Englewood avenue,	"	6	2	6	8	"
"	Corner of Circuit avenue,	"	6	2	6	8	"
Knowlton avenue,	On south line of Mr. Forbes' lot,	"	6	2	6	8	"
Leicester,	Opposite John Bishop's house,	"	6	2	6	20	Wood post.
"	Opposite Mr. Curtis' house,	"	6	2	6	20	New.
Lenox,	284 feet north of north line of Pleasant street,	"	6	2	6	8	"
"	300 feet north of first hydrant,	"	6	2	6	8	"
Lowell,	Corner of Freeland street,	"	6	2	6	6	"
Marble,	222 feet west of west line of Main street,	"	6	2	6	8	"
May,	Corner Lovell street,	"	6	2	6	12	"
Milk,	100 feet east of Franklin street,	"	6	2	6	6	"
Mill,	Corner Leicester street,	"	4	2	4	16	Flush.

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1895.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.	
Mill,	Opposite Lake street,	Philadelphia.	4	2	4	16	New.	
"	Corner Park avenue,	Chapman.	6	2	6	16	4 in. Philadelphia.	
Millbury,	Opposite Ward street,	"	6	2	6	12	New.	
"	Opposite No. 170,	"	6	2	6	12	"	
"	Corner of Albine avenue,	"	6	2	6	12	"	
"	Corner of Wade street,	"	6	2	6	12	4 in. Chapman.	
Nixon avenue,	On south line of Mr. Nixon's lot,	"	6	2	6	8	New.	
Pearl,	Corner Post Office alley,	"	6	4	6	12	"	
"	Corner Chestnut street,	"	6	2	6	12	"	
Piedmont,	Corner Pleasant street,	"	6	2	6	12	"	
"	260 feet south of south line of Pleasant street,	"	6	2	6	12	"	
Salisbury,	Corner Park avenue,	"	6	2	6	12	"	H. S.
"	At F. H. Daniels' driveway,	"	6	2	6	12	"	"
"	Opposite Highland Military Academy,	Mathews.	6	2	6	12	"	"
"	Opposite Mr. Shaw's house,	"	6	2	6	12	4 in. Mathews.	"
"	Corner Forest street,	"	6	2	6	12		"
"	On line between Daniels and Whitman,	"	6	2	6	12	4 in. Boston.	"
Shaffner,	On east line of Lincoln street,	Chapman.	6	2	6	8	New.	"
"	350 feet east of east line of Lincoln street,	"	6	2	6	8	"	"
Shrewsbury,	Opposite Waite street,	"	6	2	6	16	4 in Chapman.	
"	362 feet east of Lyon street,	"	6	2	6	16	New.	
"	Opposite Oleum court,	"	6	2	6	16	"	
Southbridge,	Corner Cambridge street,	"	6	2	6	16	4 in. Chapman.	
"	Corner Washburn street,	"	6	2	6	16	4 in. Boston.	

LOCATION, SIZE AND KIND OF HYDRANTS, NEW AND CHANGED, DURING THE YEAR ENDING NOVEMBER 30, 1895.—*Continued.*

STREET.	LOCATION.	KIND.	Size in Inches.	Number of Outlets.	Size of Connections, in Inches.	Size of Street Mains, in Inches.	TAKEN UP.
Southbridge,	284 feet south of south line of Southgate street,	Chapman.	6	2	6	16	New.
"	300 feet east of Southgate street,	"	6	2	6	16	Flush.
"	Corner Beacon street,	"	6	2	6	6	"
"	21 feet north of north line of Southgate street,	"	6	2	6	16	"
Southgate,	Opposite shop of E. Buxton & Son,	"	6	2	6	16	Philadelphia.
"	In turn of street toward Southbridge street,	"	6	2	6	16	"
Stafford,	Opposite Mr. Rose's house,	"	6	2	6	12	New.
"	155 feet east of east line of No. 13,	"	6	2	6	12	"
"	Corner Young street,	"	6	2	6	12	"
Union avenue,	Corner Houghton street,	"	6	2	6	12	4-in. Chapman. H.S.
" "	Corner Arthur street,	"	6	2	6	16	New. "
Uxbridge,	Corner Washington avenue,	"	6	2	6	12	" "
"	Corner Lincoln avenue,	"	6	2	6	12	" "
"	Corner Woodlawn avenue,	"	6	2	6	12	" "
Vinson,	Corner Stanton avenue,	"	6	2	6	8	" "
Walnut,	Corner Chestnut street,	"	6	2	6	12	"
"	Corner Maple street,	"	6	2	6	12	Flush.
"	Corner Main street,	"	6	4	6	12	New.
Washburn,	300 feet east of Southbridge street,	"	6	2	6	12	4-in. Boston.
Woodbine,	Corner Maywood street,	"	6	2	6	8	New.
"	Opposite No. 16,	"	6	2	6	8	"
Leicester,	Corner Ludlow street,	"	6	2	6	24	"
"	Opposite E. D. Thayer's mill,	"	6	4		24	Boston.

CEMENT-LINED MAIN PIPE IN USE NOVEMBER 30, 1895.

	2″	3″	4″	6″	8″	16″	Total.
1864			687			1,148	1,835
1865	144		2,851	1,077	1,523	776	6,371
1866	100				285	971	1,356
1867		647					647
1868	149		1,000				1,149
1869	1,290						1,290
1870	88		3,053	1,526			4,667
1871	115		49				164
1872			133				133
1873			549	641	2,324		3,514
1874			422	790			1,212
1875				287			287
1877					100		100
Total feet,	1,886	647	8,744	4,321	4,232	2,895	22,725
" miles	.357	.122	1.656	.818	.801	.548	4.3

SERVICE PIPES LAID TO NOVEMBER 30, 1895.

	In the Street.		Premises of Individuals.		No.
	Feet.	Miles.	Feet.	Miles.	
Prior to 1885	155,563.28	29.461	161,534	30.591	6,825
1885	7,366.5	1.395	12,822.9	2.428	366
1886	8,673.58	1.642	14,029.58	2.657	438
1887	9,674	1.832	11,418.25	2.162	469
1888	8,814.75	1.669	13,872	2.627	431
1889	10,021.75	1.898	11,264.5	2.133	472
1890	9,300.58	1.761	13,972.9	2.644	449
1891	9,307.5	1.762	14,276.66	2.704	483
1892	10,012.58	1.896	12,803.25	2.424	506
1893	8,616.25	1.631	11,064	2.095	430
1894	7,218	1.367	11,035	2.09	366
1895	7,469	1.414	12,407	2.35	366
	252,037.77	47.728	300,500.04	56.9	11,601

TOTAL LENGTH AND SIZE OF PIPE LAID AND NUMBER OF GATES AND HYDRANTS IN USE NOVEMBER 30, 1895.

	2″	3″	4″	5″	6″	8″	10″	12″	16″	18″	20″	24″	30″	Miles	Gates	Hydrants
Prior to 1895,	9,894	98	86,074	1,487	253,548	166,280	7,734	96,302	69,335	1,726	22,842	11,414	7,060	138.99	1,538	1,324
Laid in 1895,					906	11,938		17,943	7,901		950	8,683	1,415	9.42	147	94
Total,	9,894	98	86,074	1,487	254,454	178,218	7,734	114,245	77,236	1,726	23,792	20,097	8,475	148.41	1,685	1,418
Pipe taken up, 1895,	102		3,014		6,935	3,713	1,388	7,655	863	1,726	1,056			5.00	29	31
Total feet,	9,792	98	83,060	1,487	247,519	174,505	6,346	106,590	76,373		22,736	20,097	8,475		1,656	1,387
Total miles,	1.854	.018	15.731	.281	46.878	33.05	1.2	20.187	14.464		4.306	3.806	1.605	143.41		

ELEVATION OF RESERVOIRS ABOVE MAIN STREET AT CITY HALL.

Arnold reservoir,	638.87 feet.
Paxton "	609.71 "
Mann "	487.97 "
Kent's "	370.67 "

Lynde Brook Reservoir.

Rollway,	347.67 feet.
Top of dam,	351.67 "
Bottom of pipe,	310.27 "

Holden Storage Reservoir.

Rollway,	269.88 feet.
Top of dam,	274.88 "
Bottom of pipe,	239.78 "

Holden Distributing Reservoir.

Rollway,	177 feet.
Top of dam,	182 "
Bottom of supply pipe,	168.45 "
Bottom of waste pipe,	167.75 "
Bell pond, surface of water,	185.5 "
Hunt reservoir,	177 "
Elevation of Main street at City Hall above tide water,	481 "
Water pressure at City Hall, high service,	150 pounds.
Water pressure at City Hall, low service,	70 pounds.

In addition to the service pipes, which are reported in tabulated form, there have been thirty-three (33) service pipes changed, for which 588 feet of pipe was used in the street and 3,188 feet on the premises of the owner.

9,563 feet of temporary mains have been laid, the persons thus supplied paying the expense of trenching and laying, and for pipe exceeding one hundred feet.

Value of stock and tools on hand November 30, 1895, $86,786.65.

Bills have been rendered to the city treasurer to the number of 1,788, amounting to $25,554.36. Number of abatements twenty-two, amounting to $261.56. Amount of bills in hands of treasurer, November 30, 1895, $4,120.95. Amount collected during the year, $27,070.75.

Respectfully submitted,

JOHN G. BRADY,

Water Commissioner.

REPORT OF THE WATER REGISTRAR.

To the Honorable City Council of the City of Worcester:

GENTLEMEN:—In compliance with the ordinance relating to water, I herewith submit my annual report as Water Registrar.

Three hundred and sixty-five (365) applications for water were received during the year and placed in the hands of the commissioner.

The following bills for water were given to the City Treasurer for collection:

For metered water,	20,663 bills,	amounting to	$185,622 90
For annual rates,	998 bills,	amounting to	13,906 37
Total bills,	21,661	Total amount,	$199,529 27

Total amount of revenue received for the year ending November 30, 1895, $200,255.51. Of this amount $11,037.05 was from uncollected bills in the hands of the Treasurer November 30, 1894.

The amount of uncollected bills in the hands of the Treasurer November 30, 1895, was $8,632.08.

During the year the sum of $1,678.73 has been deducted from the amount charged for water rates and metered water, owing to changes from annual to metered rates, vacant tenements and adjustment of bills of water takers.

The quantity of metered water furnished during the year ending November 30, 1895, was as follows:

Elevators,	154,676,854	gallons,
Motors,	8,029,754	"
Schools,	24,617,639	"
Churches,	773,792	"

Hotels,	8,383,345	gallons,
Stables,	6,888,921	"
Fire Department houses,	1,595,132	"
Manufacturing purposes,	186,286,416	"
Stores, offices, saloons, etc.,	67,265,405	"
Steam and electric railways,	105,986,614	"
Domestic purposes,	502,150,169	"
	1,066,654,041	"
For Wm. T. Merrifield,	4,505,655	"
Street Sprinkling Department,	50,333,058	"
Total,	1,121,592,754	"

From the two latter amounts of the Street Sprinkling Department and William T. Merrifield, no revenue is received.

The number of new meters set during the year was 456, making the total number now in use 10,807.

CLASSIFICATION OF METERS.

KINDS.	SIZES.									
	⅝″	¾″	1″	1½″	2″	3″	4″	6″	8″	TOTAL
B. and F. Piston. . . .	1037	116	8		6		1			1168
Union Rotary	7469	335	156	126	157	72	21	5	1	8342
Crown	13	2								15
Desper	642	14								656
Duplex	2									2
Empire	2									2
Gem	2		1		1	3	3	1		11
Hersey	558	44	1	1	2		1			607
Shedd	2									2
Worthington	1									1
Thompson	1									1
Total	9729	511	166	127	166	75	26	6	1	10.807

Seven new elevators were put in the past year, making the total number now in use 282.

Dwellings, Persons, Fixtures, etc., Assessed for Water in the City of Worcester.

Dwellings,	10,404	Baths,	11,844
Families,	21,277	Water-closets,	25,846
Stores,	1,168	Hose,	6,407
Offices,	828	Boilers,	1,795
Saloons,	85	Horses,	5,241
Markets,	104	Cows or oxen,	807
Shops,	501	Elevators,	282
Stables,	2,091	Barber shops,	84
Persons using,	99,039	Hotels,	25
Sinks,	27,469	Schools,	65
Basins,	12,991	Motors,	53

FINANCIAL STATEMENT.

Received for metered water and fixed rates, 1894 bills,	$11,037 05	
Received for metered water and fixed rates, 1895 bills,	189,218 46	
Total revenue for 1895,		$200,255 51
Expended—		
Pay-roll, laborers,	$21,478 89	
Geo. E. Batchelder, salary,	1,500 00	
Clerical labor and canvassing,	1,299 74	
Pay of meter readers,	3,241 63	
Union Water Meter Co., repairs of meters,	2,161 07	
Abatements—water rates,	88 86	
Blankets, harness and repairs of same,	116 37	
Blank books, stationery and stamps,	220 22	
Blacksmithing,	158 53	
Care of Hunt reservoir,	200 00	
Castings, patterns and fire clay,	667 65	
Coal and wood,	262 23	
Cordage, packing and waste,	234 03	
Damage by burst of water pipe, sundry persons,	38 00	
Engineering,	7 54	

Extra labor, sundry persons,	$39	56
Furniture, bedding and repairs,	3	50
Gas,	67	41
Venturi meters,	1,827	50
Gravel, wall stone and stone work,	3	81
Hack and horse hire,	459	50
Hardware, tools and repairs of same,	843	26
Hay, grain and straw,	792	74
Hose and couplings,	78	90
Hydrants, water gates, valves and repairs of same,	4,298	25
Rent of land for drinking fountain,	1	00
Insurance on boiler,	20	00
Iron pipe and freight on same,	12,958	09
Special castings for iron pipe,	1,459	01
Iron and steel,	136	71
Labor of men and teams,	9	00
Lanterns, globes, oil, etc.,	90	33
Lead pipe and lead,	1,293	73
Lumber and carpenter's work,	176	63
Manure and grass seed,	42	20
Medical attendance on horses, and medicine,	29	30
Meters and repairs,	257	35
Paints, oils and painting,	33	26
Paving, concrete and grading,	93	83
Pipe, fittings, pump repairs and diaphragms,	213	21
Mason work on school-house meters,	136	72
Printing and typewriting,	263	38
Refreshments for laborers, and ice,	26	88
Refreshments for committee and guests,	54	00
Repairs of buildings, boiler and machinery,	26	97
Repairs of catch-basins and sewer repairs,	90	56
Rubber boots and mittens,	3	75
Sewer pipe, cement and sand,	71	84
Taxes in Leicester,	264	64
Transportation of men, and car tickets,	106	56
Traveling expenses,	23	48

Trucking, freight, express and telegrams,	$779 14	
Wagons, sleighs, and repairs on same,	219 10	
Washing bedding,	3 50	
Meter houses at Holden and Leicester,	820 17	
Emergency supply,	16,248 45	
Horses,	500 00	
Labor, etc., at reservoir,	52 88	
		$76,594 86
Interest on water loan,		64,583 33
Water loan sinking fund (per order of City Council),		3,000 00
		$144,178 19
Balance transferred to sinking funds,		$56,077 32

Of the balance $56,077.32, the entire amount will be required to pay the interest on water bonds and the contribution to the sinking funds before the collection of water bills for March, 1896.

The income department has been subject to several expenditures beyond the usual amount by reason of the short supply of water in 1894. $16,248.45 was expended in obtaining a temporary supply for Leicester reservoir, $1,827.50 for Venturi meters and $820.17 for houses for the meters, making a total of $18,896.12, which may be classed as extraordinary expenditures, and which will not be required hereafter.

REMARKS AND RECOMMENDATIONS.

Early in the autumn of 1894 the city was confronted with the prospect of a water famine, and immediate steps were taken to prevent such a state of affairs. One of the principal causes of the excessive use of water was the large number of hydraulic passenger elevators connected with the water mains. Notices were sent to persons operating elevators that after a certain date, no more water would be furnished for elevator purposes. This order seriously inconvenienced business houses that operated elevators for freight purposes alone, and after a few weeks the order was modified so as to include only elevators which used from five million to ten million gallons per annum.

At the present time elevators which require that amount of water are operated by electrical power. For the convenience of the owners, water is allowed to remain connected with the elevator, so that in case of accident to the electrical power the elvator can be run by water.

By the addition of Kettle brook and the large rainfall of the past season, it would seem that the city is now supplied with an abundance of water for years to come. I am of the opinion that all elevators now operated by water power should be allowed to continue, and that all freight and small passenger elevators that may be wanted by citizens be connected with water mains. An excessive amount of water will not be required, and the department will need the revenue from them.

Your attention is respectfully called to the large amount of water furnished Wm. T. Merrifield, Esq., free of charge, and apparently for the benefit of the Sewer Department at the expense of the Water Department.

In 1867 the city of Worcester condemned Mill brook, so called, for sewer purposes. At that time Mr. Merrifield was using the water of Mill brook for manufacturing purposes. In 1875 the Joint Standing Committee on Sewers entered into an agreement with Mr. Merrifield, in consideration of a release from certain damages, to lay a 10-inch pipe from above Court Mills dam to the factory of Mr. Merrifield and furnish 200,000 gallons of water per day, and not to exceed 300,000 gallons in any one day. For some reason this contract was never carried out, but a 6-inch pipe was attached to the street main and water furnished Mr. Merrifield in this way. If the quantity of water has been used which Mr. Merrifield is entitled to under the contract, then the Water Department has furnished over $120,000 worth of water for the benefit of the Sewer Department. I fail to see why the Water Department should continue to carry out a contract made by the Sewer Department when it is of no possible benefit to this Department.

The canvass of water takers has been taken by the meter readers and is absolutely correct. The state census taken in May gave the population of Worcester as 98,687. In November we find the actual number of water takers to be 99,039, the estimated number not on pipe lines and who do not take city water 2,500, making at this time a total population of 101,529.

Respectfully submitted,

GEORGE E. BATCHELDER,
Water Registrar.

ANNUAL REPORT OF THE CITY ENGINEER.

To the City Council of the City of Worcester:

Under requirement of the provisions of Chapter 5, Section 1, of the ordinances of the city, I respectfully submit the following report:

The engineering department is so closely identified with the work of other departments that to enumerate would be but a repetition of matter contained in departmental reports, and so thought unnecessary to be included here.

The demands upon the department have been rather beyond the ordinary, and an increase to the general force employed for a time became necessary. This was due to the failure of the Lynde Brook source of water supply, which required the procuring of a certain amount of water from Kettle brook, and later to the acquisition of that stream as a permanent source of supply.

On December 23, 1894, the temporary diversion of water from Kettle brook was made, to the relief not only of a depleted reservoir, but the anxiety of those upon whom devolved the task of averting a water famine and possible consequences through lack of water for fire purposes. With the uncertain amount of precipitation, common prudence could not do less than ensure sufficient water for the daily domestic use and possible fire demands, until such time as the spring freshets should reinforce the amount collected. Through an arrangement with the mill owners upon Kettle brook, nearly 187 million gallons was drawn from that stream. The extraordinarily heavy rains during the fall months have about filled the reservoirs, but the sense of security afforded by the acquisition of Kettle brook should be none the less satisfying. With the advent of another dry period, of which no certain prediction is possible, the water of this stream will be required, and the several dams and reservoirs should receive early attention and placed in condition compatible with their intended use. A 30-inch cast iron conduit with valve tower has been built connecting Kent's pond on Kettle brook with the Lynde brook reservoir. The excavations for the pipe line through the divide separating the two streams reached a depth of 26 feet, and in crossing an intervening portion of swampy ground an extent of mud some 25 feet in depth was encountered. This was passed over by following the required excavation with a very compact brush mattress of about 22 feet in depth, upon which was placed sufficient gravel to form a bed, and the pipe then laid. Subsequent examinations failed to detect the least settlement.

With the advent of this increase to the supply from the Lynde brook reservoir, larger mains for the conveyance of the water into the city should be laid at the earliest opportunity. The small pipes from this reservoir are entirely inadequate for the demands of to-day.

The attachment of two Venturi meters to the pipe lines at the Lynde brook reservoir during the summer affords the means for procuring information relative to the consumption of water. The conditions now exist for measuring all the water drawn from the different sources of supply for any period, and in connection with other existing apparatus, information of the greatest value to the department is now attainable.

The several reservoirs have been visited as required by ordinance, and with their appurtenances found to be in good condition.

I desire to acknowledge my appreciation of the courtesy extended by the various committees with which I have been associated, and also to my assistants for the faithful performance of work assigned them.

Respectfully submitted,

FREDERICK A. McCLURE,

City Engineer.

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